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„Can one purposefully foster innovation?“

An empirical evaluation of a pilot training as innovation promotor

Forschungsarbeit zur Erlangung

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Zusammenfassung

Der hohe Stellenwert von Innovationen für den Unternehmenserfolg ist empirisch sehr gut belegt (e.g. Schumpeter, 1931; Howell et al., 2005). Insbesondere wird das Wirken besonders aktiver und engagierter Schlüsselpersonen, den Promotoren, als wichtiger Erfolgsfaktor im Innovationsmanagement hervorgehoben (e.g. Hauschildt & Chakrabarti, 1988; Hölzle et al., 2007). Bisher wurde davon ausgegangen, dass Mitarbeiter die Promotorenrolle spontan einnehmen. Bislang wurde es noch nicht versucht, Mitarbeiter gezielt für die Promotorenrolle auszubilden. Genau hier setzt die vorliegende Arbeit an. Den Kern meiner Arbeit bildet die wissenschaftliche Evaluation der Ausbildung zum Innovationspromotor, die im April 2011 als Pilot von der artop GmbH und der Humboldt-Universität zu Berlin aufgesetzt wurde. Die Evaluation basiert auf dem 4-Ebenen-Modell von Kirkpatrick (1959) und zielt auf die Bestimmung der Trainingswirksamkeit ab. In einer Mischung aus quantitativen und qualitativen Methoden werden die Daten zu mehreren Zeitpunkten hauptsächlich mittels explorativem Vorgehen erhoben. Datenanalysen ergeben, dass die Teilnehmer zufrieden sind mit dem Training und dass sie relevantes, rollenspezifisches Wissen erwerben. Diese Ergebnisse liefern erste Anhaltspunkte dafür, dass es möglich ist, Teilnehmer gezielt und erfolgreich in ihrer professionellen Rolle als Innovationpromotor auszubilden. Als weitere Implikation dieser Resultate folgt, dass die Ausbildung ein strategisches Mittel für Unternehmen darstellen kann, um aktiv die Innovationsfähigkeit zu fördern. Die vorliegenden Ergebnisse dienen als erster Impuls, müssen jedoch in zukünftigen Studien verifiziert und spezifiziert werden.

Schlüsselworte: Innovationsmanagement, Innovationsfähigkeit, Promotoren, Unternehmen, Trainingsevaluation

Abstract

The high relevance of innovations for the firm's economic success is empirically evident (e.g. Schumpeter, 1931; Howell et al., 2005). Especially the activity of active and motivated key person, called „promotors", is emphasized as a critical success factor to innovation management (e.g. Hauschildt & Chakrabarti, 1988; Hölzle et al., 2007). Until know, it was assumed that employees take the promotor role spontaneously in a self-organized way. So far, it has not been attempted to purposefully qualify an employee as promotor. The present thesis addresses this topic by evaluating the innovation promotor training, which was launched as a pilot in April 2011 by the artop GmbH and the Humboldt-University Berlin. The program evaluation is based on the four-level evaluation model by Kirkpatrick (1959) and aims at the determination of the program's effectiveness. In a mixture of quantitative and qualitative methods, data is assessed at several points of measurement in a mainly explorative way. Data analyses revealed that the participants are satisfied with the program and that they acquired relevant role-specific knowledge. This provides first evidence that it is possible to purposefully and successfully qualify participants for a professional role as innovation promotor. As a further implication this means that the training represents a strategic means for firms to actively foster their innovativeness. To conclude, results serve as a first impulse, but have to be replicated and further specified in future assessments.

Key words: Innovation management, innovativeness, promotor, program evaluation, organization

Contents

List of abbreviations

CI	confidence interval
d	Cohen's d, effect size for dependent-means t-test
F	test-statistic for one-way repeated-measure ANOVA
H	hypothesis
N	number of people in the sample
p	probability
r	Pearson's correlation coefficient, effect size for Wilcoxon signed-rank test
SD	standard deviation
t	test statistic for t-tests
T	point of measurement
z	test statistic for Wilcoxon-signed rank test
η^2	effect size for the adjusted treatment effect in the one-way repeated-measure ANOVA
X^2	test statistic for Mauchly's test

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„Masters of the past are able to remember.
Masters of the future are able to change. “
(Chinese proverb)

1. Introduction

From an economic perspective the Chinese proverb implies that only the firms that flexibly react to changes are able to control their future. For the economic climate nowadays, it means that the key for firms' survival, economic growth and success is innovation (Tidd, Bessant & Pavit, 2005). With the rise of globalization, international competition has intensified and accelerated market dynamism (Kessler & Chakrabarti, 1996). Therefore, firms are forced to innovate continuously to increase their competitiveness and profitability (Disselkamp, 2005). The importance of innovation as a strategic device is reflected in the Boston Consulting Group's (BCG) global annual survey 2010. In an inquiry of approximately 1600 senior executives “seventy-two percent consider innovation as a top-three priority” (BCG, 2010, p.6). In particular, after an economic crisis, innovations are an important factor on the road to recovery (BCG, 2010).

The central role of permanent innovations that sell on competitive markets requires an efficient innovation management (Gerpott, 2005). In the literature, several approaches to innovation management are discussed. My thesis focuses on Hauschildt and Chakrabarti's (1988) role concept that was originally developed by Witte (1973). This theoretical model is based on the idea of extraordinarily motivated employees called “promotors” who actively contribute to a straightforward innovation process. The existence of promotors and their positive influence on the innovation process are evident in various studies (e.g. Hauschildt & Kirchmann, 1998; Folkerts, 2001; Gemünden, Salomo & Hölzle, 2007). These empirical studies show that the model's basic assumption held for several decades (Hauschildt, 1998). Nevertheless, some assumptions are no longer compatible with the firm's reality. The current requirements demand for the management of sequential and parallel innovation processes, whereas Witte (1973) assumed that promotor activity is limited to an isolated innovation process. Furthermore, the model implies that any employee can spontaneously take a promotor role, thereby developing a self-organized promoter constellation. The crucial point here lies in the limited practicability. For firms, the existence of promotors is

left uncertain and the effective teamwork created by promotors remains unpredictable. Moreover, Hauschildt (1998) doubts that spontaneous role taking can ensure a promotor's professional qualification.

This situation is evidently unsatisfactory for firms. The solution would be a systematic approach to strategic and purposefully designed innovation management. Specifically, this solution would include an active search for suitable employees who are professionally qualified to assume a key role in directing innovation processes. Let us call this person "innovation promotor". Due to the innovation promotor's professional qualifications, he might become a key figure who permanently manages innovation processes. Thus, his continuous activity would contribute to sustainable innovativeness and the development of an innovation-promoting organizational culture. Mansfeld (2011) previously provided practical indications for the active search for suitable employees. A natural next step is to train employees to fulfill this important role in the innovation process. To the best of my knowledge, this attempt has not been made yet on a professional basis. The present thesis addresses this gap.

In the focus of my interest stands in particular the training as innovation promotor. This training is so far unique in Germany and was launched as a pilot program by the artop GmbH and Humboldt University Berlin in April 2011. The program is the centre-piece of the research project GI:VE. The overall aim of the GI:VE project (***G***rundlagen nachhaltiger ***I***nnovationsfähigkeit**:** ***V***ertrauenskultur und ***E***volutionäre Wissensproduktion) is the organizational development toward sustainable innovativeness and toward an organizational culture of trust. In addition to firm-specific interventions, the innovation promotor training is offered to firms as a personnel development measure.

The heart of my thesis is the evaluation of the training's effectiveness to qualify participants as innovation promotor. This investigation attempts to answer my overall research question:"Is it possible to purposefully train people as innovation promotor to foster the innovation process?"

I aim to provide insights regarding the possibility to purposefully design innovation management. I seek to broaden the perspective of efficient innovation management implementation and support it with empirical evidence. In addition to scientific relevance, the results also have practical importance for firms, as new chances for the realization of innovation management might arise.

In the following, the theoretical background on innovation management will be presented. Based on the theoretical considerations, I develop my research question. The following chapter presents the qualitative and quantitative methods used to approach this research question. The results of the explorative and hypothesis-oriented analyses are presented and interpreted. Finally, these results are evaluated and critically discussed with reference to their validity.

2. Theory

The following section starts with the classification of innovation (2.1). Then, the topic innovation management is addressed with the focus on the promotor model (2.2). The model's origin will be described and its modification explained. Specifically, the process promotor will be characterized (2.3). The next section outlines theories and research results on innovativeness (2.4). In the end, insights from the section on the process promotor and on success factors for innovativeness are combined and serve as the basis for the derivation of qualification criteria for the innovation promotor role (2.5).

2.1 Classification of innovation

I will briefly define and characterize innovation to create a basis of understanding. Many definitions exist and the only similarity among them is with regard to novelty (Busse, 2005). Therefore, I chose two suitable definitions for the context of my thesis.

Lücke and Katz's (2003) definition assumes an organizational perspective:

> *Innovation is generally understood as the successful introduction of a new thing or method. Innovation is the embodiment, combination or synthesis of knowledge in original, relevant, valued new products, processes or services.* (Lücke & Katz, 2003, p.2)

Alternatively, Rogers assumes an economic perspective:

> *Innovation is the process of introducing new ideas to the firm that result in increased firm performance.* (Rogers, 1998, p.2) *Innovation is concerned with the process of commercializing or extracting value from ideas* (Rogers, 1998, p.5).

From an object-oriented view, innovations are classified according to the object and its degree of novelty (Hauschildt & Salomo, 2007). The novel object can be a product or a process. Product innovations are introduced within a firm or to the market. They satisfy stakeholder needs. In contrast, process innovations increase the firm's efficiency (Hauschildt & Salomo, 2007). The degree of novelty distinguishes incremental from radical innovations.

In incremental innovations, the intensity of change is moderate; for example, existing products are improved or their use is extended. Conversely, radical innovations result in drastic changes; for example, organizational structures and culture are modified. The cause of innovation derives not only from new scientific and technological insights (i.e., the science and technology push) but also the need for new solutions to any problem (i.e., market pull; Disselkamp, 2005). Thus, firms must clearly maintain an intensive exchange with their environment to understand customer needs on the one hand and rely on their employees' support, knowledge and skills to innovate on the other (Folkerts, 2001).

2.2 Innovation management and the promotor model

The continuous generation of innovation (i.e., sustainable innovation) is essential for the firm's competitiveness in the international market. The key to a stabile, economically successful position is a well-functioning innovation management (Gerpott, 2005). Because innovations challenge the status quo, a central purpose of innovation management is the coping with resistance (Hauschildt, 1993). From an innovation-oriented management perspective, Hauschildt and Salomo (2007) proposed three approaches to overcome resistance: cooperation with external partners, intra-organizational process management and promotor activity. My thesis focuses on the third approach.

The research on promotors has a long history. Schumpeter's (1912) theory of economic development was the first to distinguish between the "innovator" and "entrepreneur" roles in the innovation process. In 1973, three independent sources proved that the existence of outstanding personalities play an important role in the innovation process. These personalities were called promotors and characterized as employees who "actively and intensively foster the innovation process" (Witte, 1973, p. 15 f.). Witte launched the *Columbus Project* (1973) in Germany and showed that promotors lead to significantly higher levels of innovation. In the USA, Chakrabarti created the *NASA Study* (1974). Rothwell discovered a link between successful innovation and the activities of significant personalities in the *SAPPHO project* (1974) in England. Whereas Chakrabarti and Rothwell used an explanatory approach, Witte developed the theory based promotor model (1973).

Witte used the construct of barriers in his hypotheses. Because this construct plays a central role in the following theoretical explanations, I will briefly explain it. A barrier is an obstacle that deforms, delays or prevents the actual innovation process (Schmeisser, 1984). The reasons for barriers vary. Internal barriers can originate in the organizational culture, the management or the members of the organization. They are related to resources, culture, the system and human nature. External barriers derive from the market and the environment of the organization. These barriers are related to supply, demand and the environment (Piatier, 1984).

Gemünden, Hölzle and Mirow (2007) were the first to attempt a theoretical systematization of barriers. Their scheme is composed of four clusters: the origin of barriers, their appearance, the innovation-process stage when the barrier occurs and the perceiver who the barrier affects. Inner-organizational barriers at the individual or group level that occur at any stage of the innovation process are primarily relevant to my thesis.

The complete systematization of barriers is illustrated in figure 1.

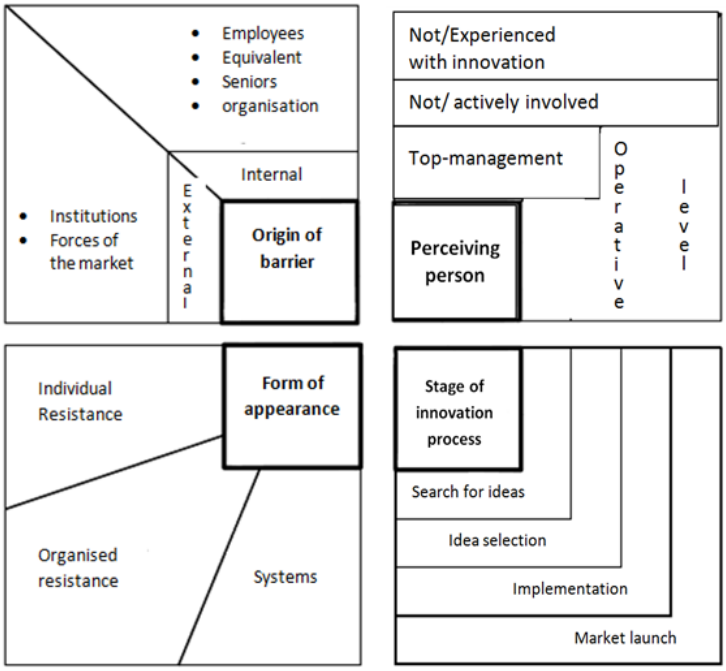

Figure 1: Systematization of barriers in the innovation process

Source: Gemünden, Hölzle & Mirow, 2007, p.113, translated by the author

Witte argued that barriers that occur during the innovation process can only be overcome "by complex multi-personal and multi-operational decision-making processes" (Witte, 1968, quoting Hauschildt & Gemünden, 1999, p. 12). This quote implies that barriers are inhibiting but surmountable obstacles (Gemünden, Hölzle & Mirow, 2007). To overcome barriers, Witte assumed a tandem of technology and power promotor who works project-related on intra-organizational concerns (Folkerts, 2001).The technology promotor handles barriers of not-knowing. For example, if a new computer program is introduced to the organization, then some employees might not know how to use it, perhaps because they do not have the necessary expertise and understanding for technique. In this case, the technology promotor provides these employees and also the management with object-specific knowledge. He is the expert in the technological field. He possesses the know-how or has the ability to acquire new knowledge with ease. With his activity, he enhances discussions and supports decision-making.

Barriers of not-wanting originate in ideological, personal, political or factual concerns (Hauschildt & Salomo, 2007). These barriers emerge from the desire to retain the status quo and avoid uncertainty. The barrier of not-wanting is dealt with by the power promotor. The power promotor derives his actions from his hierarchical potential. He is an upper management employee and uses material and non-material incentives to sanction opponents as well as protect innovation supporters. Thus, he actively influences employee willingness to support innovation. Furthermore, he provides resources, monitors goal setting and ensures a strategic fit to the firm's objectives.

Witte (1973) assumed that motivated employees spontaneously take the promotor role. Thus, the tandem develops in a self-organized way based on a common interest. Witte summarized his assumptions in theorems. The correspondence theorem describes the energy to overcome barriers. The theorem of labor division says that different people, such as in the tandem, provide this energy. Finally, the interaction theorem states that the tandem's effectiveness comes from well-coordinated teamwork. However, Hauschildt and Chakrabarti (1988) discovered that the tandem's effectiveness is stretched to its limits with high problem and system complexity. Therefore, the process promotor extended the model. In a meta-analysis, Hauschildt and Chakrabarti (1988) found empirical evidence that the troika of technology, process and power promotor is more successful than the tandem. Hauschildt and Kirchmann (1999) confirmed these findings in an empirical study of 133

innovation projects. They showed that the economic and technological success of innovation is at its highest when the troika works together compared with the tandem of a technology and power promotor, a single technology promotor or no promotor structure. Moreover, Hauschildt and Kirchmann (1999) found that under the troika more relevant information was gathered from the customer; it was more usefully integrated in the innovation process and led to a higher degree of novelty. Several other studies have found evidence that the troika brings advantages and profits to the innovation process (e.g. Folkerts & Hauschildt, 2002; Folkerts, 2001; Lechler, 1997).

Mechanistic organizational structures were prevalent when Witte developed his model. These structures are effective in relatively stable environments; however, Gemünden and Walter (1995) argued that an additional promotor is needed with regard to the change towards a global market and international competition. They called this employee "relationship promotor" because he handles inter-organizational barriers related to not knowing each other and not being able to work, not being allowed to work and not wanting to work together. This approach is not widely accepted because it is unclear "whether the relationship promotor needs a separate role or whether he is an advancement of the process promotor role" (Hauschildt, 1997, p. 94).

Folkerts (2001) also focused on the promotor model in an explorative study. Her primary concern was that the promotor model is static and concentrates on an isolated innovation process. Her approach includes a dynamic perspective because she divides the innovation process into a concept, development and realization phases and observes the intensity of promotor activity in each phase. She discovered that promotors keep their role (role preservation), take an additional role (role extension), share their role with another person (role distribution) and abandon their role (role quitting) during the course of the innovation process. Role distribution was often observed particularly for the technology and process promotor role. Role quitting was reported so often that the reasons were analyzed. Insufficient promotor performance represented a substantial cause for role quitting. In addition, promotor activity varies during the innovation process. The technology promotor is permanently active, the process promotor is especially active during the development phase and the power promotor is active during the concept phase. To summarize, Folkerts (2001) observed that promotor activity and role distribution are dynamic over the course of the innovation process.

2.2.1 The relevance of the promotor model

The gatekeeper model is a parallel approach to the promotor model. In an empirical study, Allen (1967) found evidence for the existence of a gatekeeper, a key person that handles information- and communication barriers using internal and external sources of information. In contrast to promotors, the gatekeeper is active in several projects. Under the assumption of a dynamic perspective, Hauschildt and Schewe (1997) argued that the promotor model can be converted into the gatekeeper model. The experience accrued across several innovation projects allows promotors to become gatekeepers. These authors concluded that the process promotor might especially be successively involved in innovation projects. Nevertheless, these theoretical considerations have yet to be measured.

As a final remark, I want to point out that the promotor model mainly gained acceptance in the German-speaking field of research. Anglo-American research concentrates on the champion model. The champion model precedes the promoter model (Hauschildt & Schewe, 1997). Schon (1963) developed this model that assumes that a single outstanding person can foster the innovation process. Although empirical evidence shows that promotors and champions are both fundamental to innovation management, their activity depends on the type of economic progress (Gemünden et al., 2007). For incremental innovations, the division of labor between specialists (i.e., the troika) is suitable. Conversely, in radical innovations in which economic progress cannot be based on previous knowledge, the activity of a generalist (i.e., the champion) is more appropriate (Gemünden et al., 2007). Because Anglo-American research primarily concentrates on radical innovations, whereas German research primarily concentrates on incremental innovations, the approach is chosen due to the research focus. Nevertheless, the champion model was criticized in the last decade. The main argument was that a single person could not foster highly complex processes such as radical innovation (Griffin et al., 2009).

To summarize, the promotor model is the most established theoretical multiple-person approach with regard to innovation management at the moment (Mansfeld, 2011). Hauschildt (2004) also supports this fact given that he argues that the promotor model distinguishes itself from other concepts with regard to innovation management because multiple empirical findings emphasize the link between innovation success and the troika constellation.

2.3 The process promotor

Having discussed the quality of the promotor model, I now focus on the process promotor. He plays a significant role for my thesis because he serves as the basis for the characterization of the innovation promotor.

In Hauschildt and Chakrabarti's (1988) modified promotor model, the process promotor takes a central role in the innovation process. Figure 2 illustrates this key position and visualizes the process promotor's relevance within the innovation process.

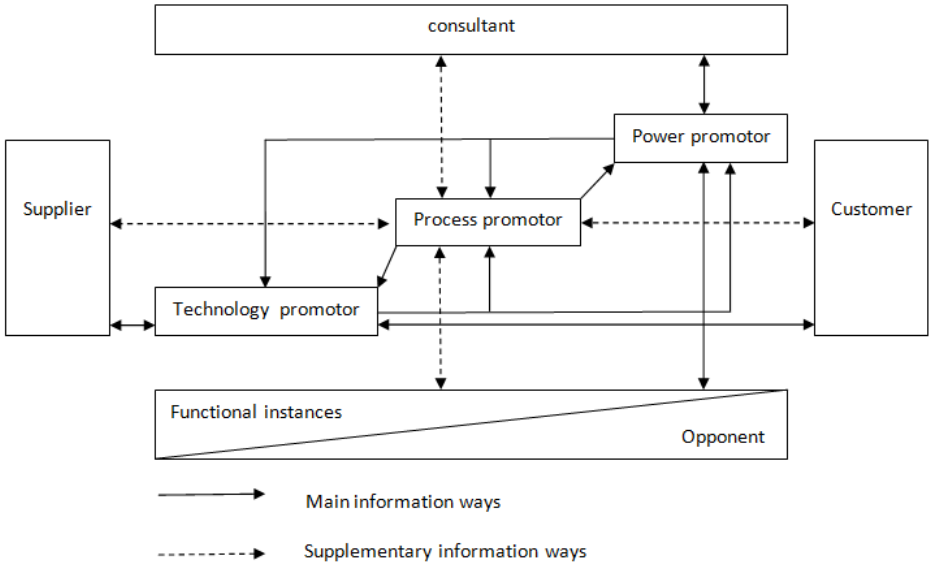

Figure 2: Communication and interaction in innovation management

Source: Hauschildt & Salomo, 2007, p.231, translated by the author

In their article "Differentiation of Labor in Innovation Management," Hauschildt and Chakrabarti (1988, p.384 f.) illustrate the process promotor's involvement with the innovation process in detail.

The process promotor's activity begins when the technology promotor presents a new idea. The process promotor translates technology-specific language into a generally intelligible language so that other organizational members and the power promotor are able to understand the idea. This ability underlines the process promotor's central position in the innovation process because he represents the connection between technology and power promotor on the one hand and integrates the relevant external stakeholders into the innovation process on the other. When the idea is realized, the process promotor sets up an action plan. Moreover, the process promotor is the navigator of the innovation process. He

coordinates the steps in the process and promotes the novel idea against opponents of innovation. To negotiate with opponents, the process promotor must understand technological concerns and be aware of relevant organizational strategies. According to Folkerts (2001), the activity of the process promotor is especially important in the core processes of development as he provides impulses and stimulates dynamics. In addition, the process promotor tackles administrative barriers or barriers of not-being allowed that comprise bureaucratic and organizational obstacles (Hauschildt & Chakrabarti, 1988). He derives his effective power from detailed organizational knowledge with regard to formal and informal structures and combines this information with sophisticated communication skills and a tight communication network (Hauschildt, 1997). To develop this expertise Folkerts (2001) discovered that employees need at least six years of work experience to successfully take the process promotor role.

Hauschildt and Keim (1997) compared the promotor model with project management and concluded that the process promotor is the theoretical pendant to the interactive project leader. The following attributes characterize the interactive project leader: outstanding interaction skills, cooperative leading abilities, extraordinary problem-solving capacities, exceptionally constructive creativity and communicative-analytical skills (Keim, 1997). As a final remark, Hauschildt states that „the interactive project leader is the ideal process promotor" (Hauschildt & Keim, 1997, p.230). Hauschildt (1998) further argues that in highly complex, strategic projects, the process promotor might assume the role of the project leader. Nevertheless, the process promoter is not suited to replace the project leader in general.

Hamann (2009) revealed insights into the process promotor's hierarchical origin. Hamann showed that a project coordinator, equivalent to the process promotor, who is an employee, is significantly more successful in implementing process-oriented structures in the firm than a project coordinator from the management level.

Mansfeld (2011) provided the most recent quantitative results when she created a personality profile for promotors. She focused on the personality traits and motivations that have beneficial effects when assuming specific promotor roles. She concentrated on three constructs relevant to innovation: the motivational structure, commitment and the need for autonomy. With regard to the motivational level, an extraordinary helpfulness characterizes the process promotor. Furthermore, integrated regulation positively influences the creation

of this role. According to Mansfeld (2011), the process promotor internalizes and adapts his role to his personal value system and recognizes that his occupation is a part of himself. In other words, he does not feel obligated to his occupation. Moreover, organizational commitment, which represents the employee's identification with the organization (Meyer et al., 1993), has a positive effect on role taking. This study did not find evidence that a distinct need for autonomy negatively affects role taking. Therefore, Mansfeld assumed that the need for autonomy is moderate in the process promotor. To summarize, these results sharpened the process promotor's profile.

2.4 Innovativeness

Innovativeness is a firm's efficiency to create innovation (Gabler, 2010). A variety of success factors related to innovativeness are discussed in literature. Within the context of my thesis, I concentrate on two relevant perspectives. First, I choose the organization as the unit of analysis and focus on the relationship between structure and culture, and the firm's ability to innovate. Second, I concentrate on the micro-level processes with regard to the exploitation of employee knowledge and skill which is also an important factor to innovation activity. Meta-analyses results conclude the paragraph.

The organizational culture and structure constitute the framework conditions for innovation. Culture and structure mutually influence each other, whereby the structure determines chances and limits to develop an innovation-promoting organizational culture (Scholl, 2004). With an appropriate organizational structure, the culture can be purposefully developed toward innovativeness (Scholl, 2004). Suitable organizational structures to dynamic and uncertain environments, which we find at the present time, are characterized by Burns and Stalker (1961). They speak of organic structures which include flat hierarchies, little process standardization, little formalization, network communication and employees who are generalists not specialists (Kirchler, 2008). This structure creates the chance to establish an innovation-promoting organizational culture. According to Denison and Mishra (1995), organizational culture is closely related to organizational effectiveness. In this context, innovation can be regarded as a part of effectiveness. Their model concentrates on four cultural factors: involvement, adaptability, consistency and mission. Involvement and

adaptability are classified as flexibility factors, consistency and mission as stability factors. In an empirical study of 764 firms, Denison and Mishra (1995) showed that flexibility traits best predict innovations, whereas stability traits predict the firm's profitability (Denison & Mishra, 2003). In their model, Denison and Mishra (1995) assumed that a strong organizational culture based on core values and common agreements (consistency) helps organizational members to coordinate. In close relation with the mission, both factors encourage the employee's commitment to the organization. Goals and objectives help the employees to orientate and to adjust their work to the overall strategic direction of the organization (mission). Thus, this makes them feel important because they contribute to the overall mission with their work. The factor adaptability allows for the flexible reaction to the dynamic environment and for the reaction to internal and external needs of change. As a counterpart to adaptability, involvement refers to the empowerment of employees. Employees are allowed to participate in organizational decision-making and take responsibility for their work. Thus, this increases the commitment to their work and motivates them to perform well. But, the crucial point of this model is that flexibility and stability factors are opposed to each other (Denison et al., 2003). The key to effectiveness is finding an organization-specific balance between these constructs. Scholl and Kunert (2011) argued that trust helps to establish a balance between flexibility and stability. As trust stimulates commitment, the employees support change processes and thus make innovation possible. Rousseau and Tijoriwala (1999) support the assumption that trust has a positive effect on innovativeness. They showed that, in case of high trust, employees attributed rather positive intentions to organizational change initiated by the management and therefore rather supported its implementation.

Scott and Bruce (1994) discovered that the degree, to which employees perceive that the organizational climate is supportive of innovation, is positively related to the employee's innovative behavior**.** Innovative behavior is described as the process to recognize a problem, to come up with a new idea regarding the solution to this problem, to find support for this idea and to realize it (Scott & Bruce, 1994). For the successful realization of an idea the knowledge and skills of every organizational member is needed (Disselkamp, 2005). Also Scholl (2004) stressed the importance of knowledge for innovativeness. In particular, he puts emphasize on the sources of knowledge that can be used during the innovation process. On the basis of Campbell's evolutionary model of knowledge production (1974), Scholl further

developed the model and adapted it for innovation. New knowledge is produced in a continuous process where already existing knowledge is varied, the best variation selected and then integrated into existing knowledge. This process takes place on individual, team, organizational and social levels. Empirical evidence demonstrated the mechanisms of knowledge production and their fundamental effect on innovation (Scholl & Bobkova, 2009). Learning via communication was especially effective in the innovation process. In total, Scholl pointed out 14 various mechanisms of knowledge production that can be combined and used to generate innovation.

Chen et al. (2010) discovered that not only the capacity to innovate but also the time to bring an innovation to the market plays an important role in modern, fast-changing environments. The so-called new product development speed has been the subject of many studies. However, because a consistent set of universal factors has not been composed yet, the results were quantitatively aggregated in a meta-analysis (Chen & Demanpour, 2010). In an aggregation of 60 studies, Henard and Szymanski (2001) showed that the most significant determinants of new product performance are product advantage, meeting customer needs, market potential, predevelopment task proficiency (which describes the proficiency with which a firm organizes the innovation process before market launch), dedicated research and development resources. The meta-analysis by Chen et al. (2010) comprises 70 studies. Four categories of new product development speed antecedents were defined: strategy, project, process and team. Chen et al. (2010) concluded that the project and team antecedents were “more generalizable and cross-situational consistent” (Chen et al., 2010, p. 2). They also discussed the relevance of team experience (i.e., the degree to which team members possess experience, knowledge and skill), process formalization, process concurrency and iteration (i.e., the process of building and testing a prototype). Moreover, goal clarity (i.e., the extent to which an innovation project’s vision, mission and goal is clearly identified and communicated), team leadership (i.e., the degree to which a project’s leader possesses skills, knowledge and experience relevant to both the management and technical aspects of the project), dedication and internal integration (i.e., the degree of cooperation among multiple team-member functions and interactions) were determinants of new product development speed.

To conclude, these meta-analyses provide an overview on the variety of factors that influence innovation. Furthermore, they emphasize the importance of qualification,

knowledge and skills, the relevance of customer orientation, the necessity of fitting innovations with strategic, organizational goals and the necessity of well-established intra-organizational cooperation and communication networks. These results reflect the relevant success factors discussed in the theoretical passages above and underline their practical relevance for firms.

2.5 The innovation promotor

The innovation promotor describes a new role in innovation management. Based on the information given on the process promotor and on success factors for innovativeness, the didactical criteria to successfully qualify the innovation promotor will be appointed in the following section.

The innovation promotor role most likely corresponds to the process promotor role. Thus, his main task will be the coordination and encouragement of the innovation process. Hauschildt and Chakrabarti (1988) have pointed out that one of the process promotor's tasks is to communicate and interact with internal and external stakeholders. This includes the mediation between people, the assurance of a permanent information flow and the connection of people with relevant knowledge. In terms of the innovation promotor's qualification this means that participants have to be taught conversation and moderation techniques and have to be encouraged in developing communication and negotiation skills. As a second field of activity, Hauschildt and Chakrabarti (1988) mentioned the process-oriented monitoring and directing of the innovation project. To give first impulses the innovation promotor has to be capable of encouraging other employees to generate ideas. Here, he will need methods and techniques to stimulate the employees. In the next step, when the innovation promotor has identified a potential idea and has initiated its realization, his main task is to keep the innovation process going. Techniques from project management and the general understanding of processes will help to fulfill this task. Moreover, in case of conflicts the innovation promotor should be qualified to cope with opponents. To lead opponents into a constructive dialogue negotiation skills and moderation techniques are helpful. Farther, the innovation promotor has to be trained conflict-solving strategies. Besides the skill of conflict-solving, he has to understand the underlying processes

in conflicts. Factual knowledge about the different types of conflicts and about the course of conflicts enables the innovation promotor to apply the appropriate strategy. So far, the explanations by Hauschildt and Chakrabarti (1988) have lead to the identification of social and methodological competencies that should be part of the innovation promotor's qualification.

Due to the high relevance of the success factors for innovativeness that were outlined in the previous section, the innovation promotor, as the key figure in innovation management, has to be aware of these success factors. His ability to act will be further increased by such role-specific knowledge. The innovation promotor's professional competence has to include knowledge on supportive organizational framework condition for innovation. With this understanding he can purposefully initiate measures to improve the organizational conditions and can contribute to the establishment of an innovation-promoting organizational culture. Moreover, the innovation promotor has to be sensitized to the various sources of knowledge. With the awareness of these mechanisms he can give impulses, can stimulate these mechanisms and can foster an efficient innovation process. In brief, based on his knowledge he sets standards in innovation management.

To summarize, an integral part of the qualification as innovation promotor has to be the transfer of role-specific knowledge, the teaching of methods and techniques and the training of social skills.

3. Research question

The promotor model is a theoretical concept with a long history that has been tested in practice. Several studies found evidence for the existence of the promotors and their positive effect on the innovation process (Hauschildt & Chakrabarti, 1988; Walter, 1998; Hauschildt & Kirchmann, 1999; Folkerts, 2001; Gemünden, Salomo & Hölzle, 2007). In brief, promotors are a fruitful approach to innovation management in theory; however, in practice two critical points have been observed that prevent the organization from realizing the promotor's full potential. The first aspect is unpredictability. Promoters are assumed to come together spontaneously in a self-organized way based on a common interest (Witte, 1973); thus, the development of the promoter constellation depends solely on extraordinarily motivated and active employees who choose to foster an innovative idea. The organization has no influence on the development of the promotor constellation. The second aspect refers to a lack of professionalism. Hauschildt (1998) bemoaned that the promotor roles are taken without any assistance by the human resource department. Thus, he speculated that the promotors' qualifications are not assured. Folkerts (2001) supported this suspicion when she observed that promotors give up their role during the innovation process due to insufficient performance. She concluded that the human resource department should intervene by actively searching for qualified promotors. Mansfeld (2011) provided promising research results for this approach by concentrating on promotors' personality traits and their motivation to assume that role. She concluded by providing a role-specific personality profile for each promoter. This implies that now, the organization has the possibility of actively searching for suitable employees that take a certain promotor role. Once the employee is identified he might be qualified in a professional training. Clearly, the implementation of efficient innovation management would be an enormous benefit to the organization because it could rely on a permanently available promotor who professionally directs and fosters the innovation process. Until now, professional training has not been offered yet; thus the attempt to qualify an employee as promotor could not be made. Out of this circumstance my research question arises:

Is it possible to purposefully train people as innovation promotor to foster the innovation process?

The evaluation of the innovation promotor pilot training launched by the artop GmbH and Humboldt University Berlin in April 2011 provides the means to answer this question. Specifically, this evaluation serves the purpose to determine the training's quality and effectiveness. As such, training and the successful transfer into the working field have a high economic relevance; thus, organizations must be certain that their investment pays off (Schaper et al., 2008). Therefore, this evaluation fulfills a legitimization function (v. Rosenstiel, 2003).
The concrete question that guides the evaluation is:

How effective is training at encouraging the development of the innovation promotor role?

To answer this question, I apply Kirkpatrick's (1959)[1] four-level evaluation model, which is the most common effectiveness analysis approach (Arthus et al., 2003). Kirkpatrick suggests the sequential evaluation on four levels within a time frame of up to 12 month after training. With regard to my thesis, the first two levels, reaction and learning, are relevant because they can be assessed during and shortly after training. To assess both levels, I use quantitative methods that are completed by qualitative interview data. An explorative strategy examines the reaction level analysis, whereas a hypothesis and an explorative approach direct learning level analyses.
In the first step, I assess participants' meta-expectations with regard to the training at the reaction level. Meta-expectations reflect participants' ideas regarding how the training should be designed so that they are successfully qualified for their innovation promotor role. The assessment concentrates on two questions:

What do the participants expect the training to be like to become successfully qualified?
Do the meta-expectations change over the course of training?

The next step on the reaction level includes a satisfaction questionnaire. The questionnaire is used to determine whether participants' expectations concerning the training content,

[1] The full model is explained in detail in section 4.3.

methods and trainers performance are met. These data are again analyzed in an explorative way with regard to two questions:

To what extend are the participants satisfied with the training?
How does the satisfaction develop over the course of training?

To support the quantitative satisfaction data, additional insights with regard to the motivation to participate in the training, the distinctive characteristics of the training and suggestions for improvements in the training's effectiveness are collected at the interview.
The learning level can be assessed based on the reaction level information. The learning level evaluation assesses whether the training methods and implemented learning mechanisms contribute to the acquisition of role-specific knowledge and skills. Pivotal evidence for the training effectiveness would be given if a substantial learning effect for theoretical knowledge, representing factual knowledge, and practical knowledge, which refers to skills, could be found. To detect such an effect, I use a pre-post design. The knowledge measurement prior to the training constitutes the baseline, and it is compared to the second measurement after the first half of the training. The following hypotheses derive from this directive:

Hypothesis 1: The theoretical knowledge at the second point of measurement is higher than the theoretical knowledge at the baseline measurement.
Hypothesis 2: The practical knowledge at the second point of measurement is higher than the practical knowledge at the baseline measurement.

A second learning-level assessment concentrates on participants' role-expectations. Role-expectations express participants' opinions concerning the essential characteristics and abilities of their future role as innovation promotor. Using a questionnaire, I aim to determine whether the training shapes and clarifies this role. The exploratory analysis is led by the following questions:

What role-expectations do participants have at the beginning of the training?
Do expectations of the future role change after it is discussed and considered during training?

Again, the data of both questionnaires are completed by interview data. Here, I concentrate on participants' views of the most effective training methods, on the time spend to reflect training contents beyond the regular training session and on the effort to actively transfer the training content to the working field.

To summarize, the evaluation on the reaction and learning level should provide evidence of the training's effectiveness. This result would assure the training's quality and legitimize it as a personnel development measure. As a direct consequence, my central research question might be confirmed. In other words, it would be indeed possible to purposefully train an employee as innovation promotor. This would be a first step to close the gap concerning the purposeful encouragement of innovation. The suspicion regarding insufficient professionalism of promotors would be corrected. The practical relevance of the results could create new opportunities for organizations to organize a sustainable innovation management. With the help of effective training, organizations might develop its employees and employ a permanent promotor who professionally manages inner-organizational innovation projects. This might then minimize unpredictability within organizations.

4. Methods

The evaluation of the training as innovation promotor serves the intention to answer the research question outlined in the previous section. Before I describe the evaluation model (4.3), I will describe the sample (4.1) and the subject of evaluation – the training (4.2). Then, I present the concrete evaluation methods (4.4) and name the operational hypotheses (4.5). Finally, I will give an overview on the missing data techniques I implemented (4.6).

4.1 Sample

The sample consists of 15 participants that voluntarily participate in the training. Their participation is for free. 53 percent of participants were recruited from national firms on a direct or indirect way via the GI:VE project. Participants spread almost equally across both genders, with 8 women (53 percent) and 7 men (47 percent). The average participant in years is 38 (SD 8.89, min = 25, max = 51). The average work experience in years is 13.2 (SD 9.16, min = 1, max = 30). All aspects on the qualification are reported in table 1.

Table 1: Sample description concerning education and profession

Highest educational achievement			
		Absolute	**Percentage**
	Post doc	1	7%
	University degree	10	67%
	Apprenticeship	4	27%
Actual position			
	CEO	3	20%
	Other leading position (e.g. project/ team leader, head of department)	7	47%
	No leading function	5	33%
Size of enterprise			
	Small	2	13%
	Medium	5	33%
	Big	8	53%
Branch			
	Catering & hotel industry	2	

	Construction	1	
	Economic service	2	
	Energy supply	1	
	Healthcare	1	
	Housing	1	
	IT	1	
	Manufacturing industry	1	
	Metrology & process engineering	1	
	Recycling	2	
	Telecommunication industry	1	
	Trade	1	

4.2 Innovation promotor training

The innovation promotor training is a behavior-oriented program including sequences of knowledge transfers. The aim of the training is to help participants find and shape their professional roles as innovation promotors at their organization and to certify them as innovation promotor. In their role as innovation promotor, these employees should actively contribute to the sustainable improvement of organizational innovativeness. In the long run, they should conduce to the establishment of an innovation-promoting organizational culture. Person-oriented training provides specific skills and develops role-specific core competencies with the overall aim of enriching the participant's professional capabilities. According to Bachmann (one of the CEO's at the artop GmbH) et al. (2010), core competencies comprise social, professional, methodological, field and personal competence. The first session especially stimulates social skills. Bachmann et al. (2010) refer to social skills as those that shape and clarify a professional role. The second through fifth sessions concentrate on enriching professional competence. In this context, professional competence includes an understanding of theories, models and approaches regarding change, development and innovation. In brief, in the first part of the training, the participants gain expertise that helps them to analyze and evaluate innovation processes. The second half of the training emphasizes improving methodological competencies. In the sixth through ninth session, conversation techniques and moderation, project management abilities, conflict solving strategies and techniques concerning project evaluation are taught. The aim of these sessions is to teach participants to adequately use these methods and techniques depending

on target group and situation. Thus, the participants learn how to direct the innovation process.

Moreover, special value is attached to social and affective learning mechanisms. Bachmann et al. (2010) emphasized four mechanisms that promote group dynamic learning processes. Learning via feedback is the predominant learning mechanism used in the training. A feedback loop that allows all participants and trainers to comment follows every practical exercise. In addition to its pedagogic value, feedback elaborates self-perceptions (Kauffeld & Grote, 2005). Learning via reflection is also an integral part of the training. Self-reflection fosters personal competencies (Bachmann et al., 2010). Reflection via group discussions provides the participants with new insights that stimulate existing attitudes and values. Furthermore, the reflection of one's own behavior and actions contributes to personal development (Loevinger, 1976). Observational learning also occurs during the training. Participants or trainers serve as role models for others. Other participants observe and adapt these behavioral patterns to their situation and eventually add them to their repertoire (see Bandura, 1979). Learning via trial and error comprises participant attempts to immediately use a method that they just learned in the training. Afterwards, their experiences with regard to successful and unsuccessful attempts are discussed in the group. Participants experience an immediate learning effect using this technique. These social learning mechanisms contribute to the fact that learning is encouraged throughout the training. Participants especially profit from the heterogeneous group constellation because the exchange of information occurs across hierarchies and disciplines.

Methodological variety is also a characteristic of the training. Many methods, such as role playing, metaphors, theatric performances, case studies, communication games and creative methods inspire participants to apply their theoretical training to their personal work experiences. The personal project is another facet of practice-orientation in the training. Between training sessions, participants complete a practical project that applies and transfers the training contents to the working environment. Another transfer tool is the learning diary. This is a booklet that was given to the participants to take notes and to write down spontaneous ideas on how to apply a new method in practice in a future situation. With this strong focus on practice-orientated training, learning transfer is possible.

To summarize, the training might affect the acquisition of knowledge and skills, the modification of behavior and the development of personal competences.

4.3 Kirkpatrick's four-level evaluation model

Kirkpatrick developed the four-level evaluation model in 1959. It is still the most popular and most employed evaluation model in the corporate, government and academic world (Arthus et al., 2003).

The model is output-related and suitable to analyze the effectiveness of training. In his systematization Kirkpatrick proposed a sequential procedure. As displayed in Figure 3, the evaluation starts at the reaction level and then continues with the learning level, the behavior level and finally the results level.

Figure 3: Chronological and methodological sequence of Kirkpatrick's evaluation levels

The levels are composed in a hierarchical structure, where the previous level provides conditional information for the following level; for example, the higher the satisfaction the more motivated the participants to learn. If the participants have learned during training a modification of behavior at the workplace is more likely.

The sequence of evaluation levels is connected to a chronological order. Kirkpatrick suggested conducting the reaction level evaluation directly after training. For the learning level evaluation, a suitable point is during or shortly after training. Changes on the behavior level can be measured three to six month after training. Effects on the results level are observable six to twelve month after training. Within the context of my thesis, I assess the first two levels. Therefore, my further explanations concentrate on the reaction and learning level.

The reaction level evaluation aims at the acquisition of the participants' reaction to the program. Suitable methods are self-rating questionnaires and interviews. On this level, the satisfaction with training methods, with presentation techniques, with the trainers and the framework conditions of training can be assessed. Moreover, it is of interest whether the participants' expectations were met and whether the participants have any hints on the improvement of the program. The overall intention is to find to what extend the training

meets the need of the participants. According to Kirkpatrick (1998), a positive reaction to training does not guarantee learning, but it paves the way for learning and increases the chance that participants make an effort to learn. To realize the evaluation properly, Kirkpatrick made the following suggestions: “Design the sheet that reactions can be tabulated and quantified. Obtain honest reactions by making the sheet anonymous. Allow trainees to write additional comments not covered by the questions” (Kirkpatrick, 1996, p.54 f.).

The learning level evaluation provides information on learning success and helps to estimate chances of successful learning transfer. According to Kirkpatrick learning has taken place when at least one of the following occurs: attitudes are changed, knowledge is increased or skill is improved (Kirkpatrick, 1996). For the learning level evaluation, interviews, role plays, simulations or paper and pencil tests are appropriate. Kirkpatrick gave the following advice for the learning level evaluation:”Use a pre-post design so that learning can be related to the program. Use a control group, if feasible, to compare with the experimental group that receives the training. Where possible, analyze the evaluation results statistically so that learning can be proven in term of correlation or level of confidence” (Kirkpatrick, 1996, p.56 f.).

The behavior level evaluation aims at judging the actual learning transfer and focuses on behavioral changes at the work place. The appraisal of performance should be made by several people. A 360 degree feedback, interviews and behavioral observations are suitable for the assessment. The evaluation on the results level serves the aim to assess the training effect on the organizational level. Here, key figures and data analyses are the means of evaluation.

4.4 Methods and survey design

4.4.1 Instruction

Before the participants answer a questionnaire, they receive a verbal or written instruction beforehand. Participants are asked to answer spontaneously and to trust their feeling if they are not exactly sure about an item. Furthermore, it is emphasized that their personal opinion

and estimation is appreciated throughout the whole evaluation. The answering of questions is voluntary, except for the obligatory insertion of the personal code.

4.4.2 Reaction level evaluation

On the reaction level, I use two questionnaires. Quantitative data are additionally completed by interview information. The two questionnaires and the interview employed on the reaction level can be found in Appendix A.1 and B.

4.4.2.1 Meta-expectations questionnaire

The first questionnaire concentrates on the participants' meta-expectations on the program. Participants are asked to judge, which training aspects they personally regard as important for a successful qualification. Following Kirkpatrick, the questionnaire is used in a pre-post-design, with the first point of measurement before the training's beginning and the second point of measurement after the fifth session. At the second point of measurement, a control question is included which asks if the participants consider themselves on a promising way towards a successful ending of the program.

The ideas for the items on meta-expectations were drawn from a criteria catalogue a former diploma student at the artop GmbH had compiled (Sawert, 2004). She had collected and classified expectations that were expressed during different trainings at the artop GmbH. I adapted the expectations to the innovation promotor training and clustered them on the basis of intuitive-rational considerations (Tränkle, 1983). The final structure was determined during a brainstorming with my advisors. The items and cluster are presented in table 2.

Table 2: Clustered items on meta-expectations

Cluster	Items
Interaction & networking	• Clarification about the innovation promotor role • Exchange of experiences with other participants • Networking with other innovation promotors • Input by experts
Methodological competence	• Practice-relevant exercises • Methodological manuals • Transfer of expertise • Theoretical input

Personal development	• Comparison of self image and how others perceive us • Feedback from other participants & trainers • Feeling of self-efficacy • Self-reflection

4.4.2.2 Satisfaction questionnaire

The second questionnaire focuses on the satisfaction with training. Participants are asked to evaluate the training content, the trainer tandem and didactics on a five-point Likert scale. On the back page, open questions allow for comments on positive and negative aspects and on personal insights on the theoretical and practical level. The paper and pencil test is given to the participants after every session. Participants who have to leave earlier can use an online version of the evaluation sheet at home. In the end, I will have collected data from five points of measurement.

The questionnaire on satisfaction was developed by the artop GmbH on the basis of popular literature on evaluation. The questionnaire has ever been tried in trainings, tested and thus been trusted.

Special about the use of this questionnaire is that it serves formative evaluation. The results are reported shortly after training. This feedback allows for the optimization of the program because the suggestions for improvements can be realized in the next session. Conversely, evaluations conducted with the other questionnaires on the reaction and learning level serve summative evaluation. They provide information on the training output.

4.4.2.3 Interview on the reaction level

Qualitative data of a partly structured telephone interview complete the quantitative assessments on the reaction level. The interview is conducted after the fifth session and takes about 15 minutes. The appointment is arranged at a convenient point of time for the participants.

The aim of the interview is to gain further insights on the reaction level that are not covered by the questionnaires. In particular, the interview is valuable to figure out the participants' motivation to participate in the program and to get an impression on what makes the

training special to them. Moreover, I ask whether the participants also recognize any personal development besides their professional qualification as innovation promotor.

4.4.3 Learning level evaluation

On the learning level two questionnaires are used and completed by qualitative data from the interview. For the two questionnaires and the interview employed please see Appendix A.2 and B.

4.4.3.1 Knowledge and skills questionnaire

The first questionnaire refers to knowledge and skills. Both aspects are evaluated on two separate scales. The first scale covers declarative knowledge. Participants are asked to evaluate in how far they know the item's definition and meaning. The short form that appears in the questionnaire is expressed by "I know". The second scale depicts procedural knowledge and skills. Here, participants judge if and to which degree they have already made practical experiences with the item and whether they know how to implement it in practice. To capture this ability, the expression 'I am able to' is used.

To get an impression of the questionnaire, figure 4 depicts a sample item of the second session on "idea management".

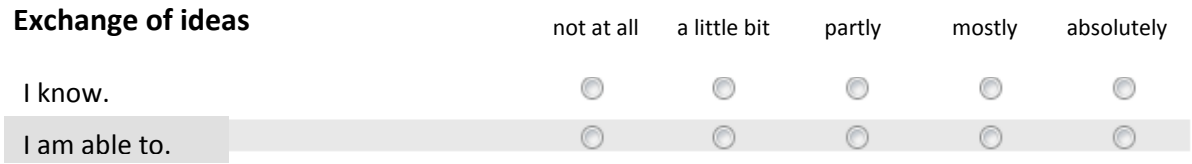

Figure 4: Sample item from the knowledge and skills questionnaire

In sum, there are 36 items for each scale. The items represent methods, procedures and modes of behavior. I use a pre-post design for the evaluation. At any point of measurement, participants have to evaluate all nine sessions independent of whether they were already trained or not. To prevent participants from matching the items to the appropriate session, all items are randomized.

The questionnaire's construction evolved in several steps. First, I generated learning goals for every session. As an orientation, I used the theoretical constructs of the GI:VE project's standard questionnaire. Further thoughts were added with the help of the training brochure

that included a description of every training session. Then, I created three up to five items for the first until ninth session, excluding the tenth session as it is a revision on the previous sessions. This procedure was mainly orientated on the intuitive-rational construction of questionnaires (Tränkle, 1983). The composition of items was accomplished with respect to contextual considerations to the best of my knowledge and belief. The final set of items resulted out of the feedback on the item collection by the trainers. The differentiation in judgment on the two scales originated from a project management self-rating sheet provided by the German society for project-management e.V. (GPM, 2005).

4.4.3.2 Role-expectation questionnaire

The second questionnaire on the learning level concentrates on the participants' role-expectation. Participants are asked which characteristics and activities they regard as relevant for the implementation of their role as innovation promotor. In a pre-post design, the participants' ideas on their future role are assessed.

The items of this questionnaire were generated by the participants. In the first session, they were asked to individually write down approximately three characteristics of an ideal innovation promotor. After the discussion in the plenum, the final set of 30 items was created. The items were classified into four clusters that had been prepared by the trainers. The items and cluster are presented in table 3.

Table 3: Clustered items on role-expectation

Cluster	**Items**
Gut feeling & Heart	• Communication talent • Feeling for timing • Enthusiastic • Empathy • Comprehension of employees
Thinking	• Informed about internal & external belongings • Analytical & structural abilities • Combine ideas & knowledge • Systemic thinking • Openness • Persistent • Guidance • Creativity

	• Courage • Curious
Tools	• Ability to motivate others • Marketing consciousness • Listen carefully • Moderator • Coach
Basis	• Accepted contact person for colleagues and the management • Contact to and acceptance by decision makers • Acceptance by the organization • Networker intern & extern • Competent appearance • Self-confident • Assertiveness • Dynamic • Teamer • Trust

4.4.3.3 Interview on the learning level

Quantitative data are again completed by interview data. The questions refer to the relevance of training contents giving special attention to role-specific input. I intend to extract the most effective training methods. Moreover, I try to find out how much time the participants spend with follow-up work, reflection and the active discussion of training issues. Furthermore, I try to get an impression of the participants' effort to actively transfer the training content to their working field. As a prospect for future evaluations, I try to discover first hints on changes in behavior that are noticed by the participants or their colleagues.

4.4.4 Overview on the survey design

To get an overview on the survey design, figure 5 displays all quantitative and qualitative evaluation methods.

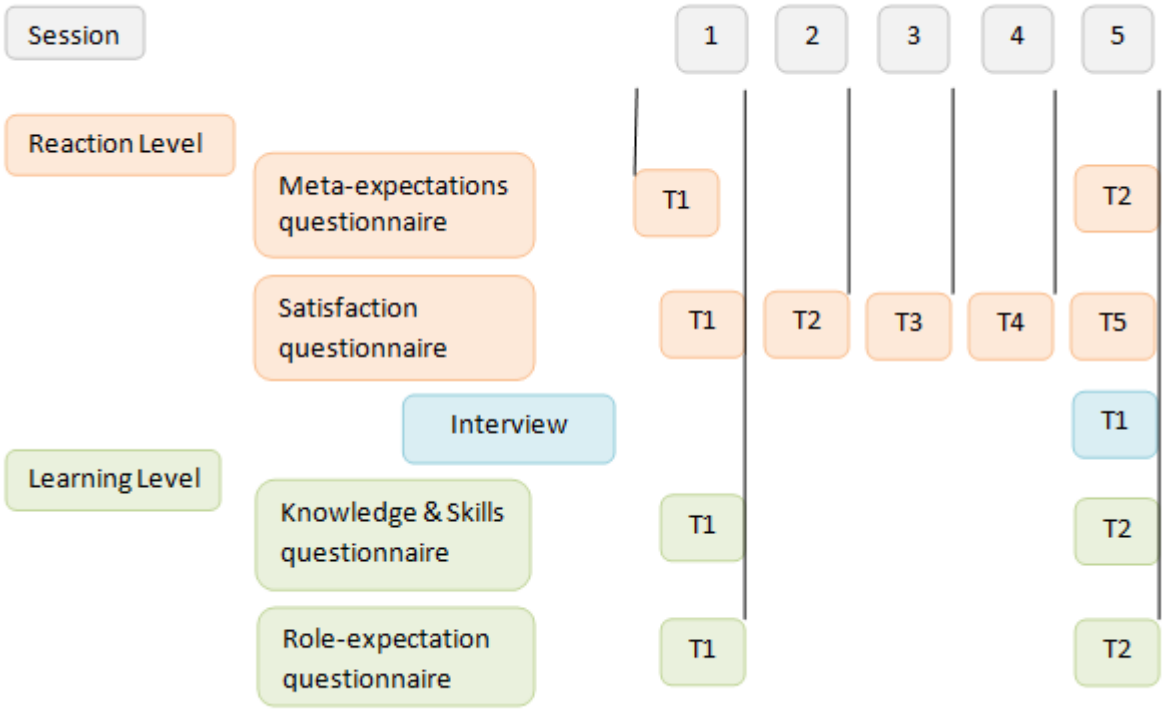

Figure 5: Methods and points of measurement on the reaction and learning level

Except for the paper and pencil satisfaction questionnaire, all other questionnaires are constructed with the program *Unipark*. The EFS survey tool by *Globalpark AG* is a web-based tool that helps to create professional scientific surveys. Participants receive the link to the survey via mail. After the insertion of the personal code, participants fill out the questionnaire. Data is automatically saved in *Unipark* and can be exported to different analysis programs. The personal code and the web-based procedure allow for absolute anonymity. With this program I create one online questionnaire that integrates the meta-expectations questionnaire, the knowledge and skills questionnaire and the role-expectation questionnaire. The approximate process time is 15 minutes.

4.5 Operational hypotheses

In the first step, the effectiveness of the training is assessed on the reaction level. Data will be analyzed in an explorative way. The concrete questions that direct my analysis were presented in section 3. The effectiveness on the learning level is assessed with two questionnaires, one of them the questionnaire on knowledge and skills. Here, the data analysis is directed by the following hypotheses:

H1: The theoretical knowledge at the second point of measurement is higher than the theoretical baseline knowledge.

H2: The practical knowledge at the second point of measurement is higher than the practical baseline knowledge.

Thus, the operational hypothesis of hypothesis 1 reads:

H1a: The total score of the theoretical knowledge items at the second point of measurement is higher than the total score of the theoretical baseline knowledge items.

The operational hypothesis of hypothesis 2 reads:

H2a: The total score of the practical knowledge items at the second point of measurement is higher than the total score of the practical baseline knowledge items.

The evaluation takes place after half of the training which is why there are topics that were already part of the training while others will follow in later sessions. To account for this heterogeneity, the items are clustered into cluster 1 and cluster 2. Cluster 1 represents all items of the sessions that have already been trained (session one to five), whereas cluster 2 includes all items of the sessions that have not yet been implemented (session six to nine). The aim of the clustering is to discriminate between the contents. In fact, the learning effect should only be detected in cluster 1 because it captures the contents that have already been taught.

The latter insight is picked up by the operational hypothesis for hypothesis 1:

H1b: The total score for the theoretical knowledge items of cluster one is higher at the second point of measurement than at the baseline evaluation.

H1c: The total score for the theoretical knowledge items of cluster two do not differ at the two points of measurement.

Operational hypotheses for hypothesis 2 read:
H2b: The total score for the practical knowledge items of cluster one is higher at the second point of measurement than at the baseline evaluation.
H2c: The total scores for the practical knowledge items of cluster two do not differ at the two points of measurement.

4.6 Analysis methods

The statistical program I use for analysis is PASW 18.0 which was previously known under the name SPSS. The hypothesis testing is based on a-priori determined level of significance $\alpha = .05$. That means that the risk to reject the null hypothesis erroneously does not exceed five percent. In the following, I will briefly describe the tests I used.

Kolmogorov-Smirnov-test
The Kolmogorov-Smirnov test is a non-parametric test to check whether a particular set of data deviate from a comparable normal distribution (Field, 2009). The test has to be non-significant to support the hypothesis of approximately normally distributed data. Given this case, parametric tests can be employed. In the following, the Kolmogorov-Smirnov-test is used to check the underlying assumptions for the dependent-means t-test and the one-way repeated-measures ANOVA.

One-way repeated-measures ANOVA
The one-way repeated-measures ANOVA is a parametric test that is used to compare more than two means realized by the same sample. Assumptions for a valid use of this method are interval, normally distributed data and sphericity. The assumption of sphericity is tested with the Mauchly's test. The test should be non-significant to meet the assumption.
At first, a global test is run that reports if a significant difference between at least one of the compared means can be detected. Given this case, a local test is applied to identify which

particular means differ significantly. Classical post-hoc tests for inner-subject factors of repeated-measures are not available in PASW 18.0. Instead the program offers a basic post-hoc option that includes pair-wise t-tests with Bonferroni correction.

PASW 18.0 calculates the effect size partial squared-eta that represents the adjusted treatment effect. To classify the effect size, I follow the classification proposed by Cohen (1988). According to this classification, effect sizes ± .01 are labeled as small, ±.06 as medium and ±.14 as large.

Dependent-means t-test

The dependent-means t-test is a parametric method that is used in a repeated-measures design. The test checks whether two means differ significantly from each other. The underlying assumption for statistically valid results is that data are normally distributed at the interval level. The effect size I use is Cohen's d. For its classification, I orientate on Bortz & Döring (2006). Effect sizes > .50 are referred to as large, .50 – .30 as moderate, .30 – .10 as small while values below .10 are called trivial.

Wilcoxon signed-rank test

The Wilcoxon signed-rank test is the non-parametric equivalent to the dependent-means t-test. The general procedure is the same since also here two different sets from the same sample are compared (Field, 2009). The test requires interval data and it is applied when data are not normally distributed. The effect size is captured by r (Field, 2009). According to Field (2009), effect sizes ±.50 are large, ± .30 medium and ± .10 are small.

4.7 Dealing with missings

There are two different forms of missings coded in my data set. On the one hand, there is number "99". This marks a missing labeled *missing completely at random* (MCAR). It occurs for example when a participant does not attend the training and can thus not answer the questionnaire.

The second form of missing is number "-77". This missing is coded when participants in general answer the questionnaire, but leave out single items.

To run valid statistical analyses in every case, a complete data set is necessary. As the sample is quite small with a total of 15 participants, I do not want to exclude any participant. Therefore, I think of convenient ways to impute missing values. In the following, the techniques for the different questionnaires are presented.

Satisfaction questionnaire: Missing "99"

In the satisfaction questionnaire missing "99" is predominantly coded. The sample differs in its number at every of the five points of measurement. In other words, in every session there is always a different person absent. In the first and third session 80 percent, in the second and fourth session 93 percent are present. In the fifth session all participants attend the training. I replace all eight missing data sets for the respective participants.

Applied missing data technique

Let me assume that participant x does not attend training session one, but he is present in session two to five. My priority is to imitate the individual answer pattern in the best possible way to maintain the variance. I try to find out which response pattern participant x shows in contrast to the other participants.

The procedure is described for a single item for the absent person. In the end, the procedure is then transferred to all 25 items of the respective session.

Indices:

y = participant that is present in session s and answers the questionnaire

y = 1, . . . ,$\overline{y}$ (s_1)

x = participant that is not present and does not answer the questionnaire at all

i_k (x, s_1) = missing item in the session that will be imputed for the absent person

i_k = 1,…,5

m = missing

a = answered

k = 1, …, 25

(1) At first, I calculate $mean_a$ for item (i_k) session one (s_1) across all present participants y.

$$mean_a\,(i_k, s_1) \;=\; \sum_{y=1}^{\bar{y}\,(s_1)} \frac{i_k\,(y,\; s_1\,)}{\bar{y}\,(s_1)}$$

(2) Then I create an overall $mean_a$ for the item across session two to five across all present participants y.

$$mean_a\,(i_k, s_2 - s_5) = \sum_{s=s_2}^{s_5} \sum_{y=1}^{\bar{y}\,(s_1)} \frac{i_k\,(y,\; s\,)}{\bar{y}\,(s_1)} \times \frac{1}{4}$$

(3) In the next step, I have a look on the individual answers of participant x for the item across session two to five. Again, I calculate the overall $mean_m$ for the single item across session two to five for participant x.

$$mean_m\,(i_k, s_2 - s_5) = \sum_{s=s_2}^{s_5} \frac{i_k\,(x,\; s\,)}{4}$$

(4) Then I calculate a factor k as the fraction of the overall $mean_m$ for the item for participant x over the overall $mean_a$ for the item across all participants y.

$$k\,(i_k, x) = \frac{mean_m\,(i_k, s_2 - s_5)}{mean_a\,(i_k, s_2 - s_5)}$$

(5) Finally, I refer back to the responses in session one, where participant x is not present. I multiply $mean_a$ for the item across all participants y with factor k. This is then the new value for the corresponding item for participant x.

$$i_k(x, s_1) = k\,(i_k, x) \times mean_a\,(i_k, s_1)$$

Satisfaction questionnaire: Missing "-77"

"-77" missings rarely occurs in the satisfaction questionnaire. In total, there are only six values missing across all sessions. In all cases the individual value does not deviate from the group mean, which allows me to replace the missing values by the group mean of the corresponding item and session.

Knowledge and skills questionnaire: Missing "99"

In the knowledge & skills questionnaire there was one "99" missing at the baseline evaluation. As the post-evaluation has little validity without a baseline measurement to compare, I decide not to impute the missing values. Exceptionally, I exclude this participant from the analysis and calculate the results with a sample of N = 14.

Knowledge and skills questionnaire: Missing "-77"

In several cases missing "-77" occur. Again, due to the fact of a pre-post design, single pre- or post-scores have little validity. Therefore, I decide to include only items that are answered pre and post. In sum, every participant has to answer 72 items at each point of measurement. As only complete sets of pre- and post-item are include, only six participants provide a complete 72 by 72 response set. Therefore, I decide to weight every single answer with relation to answers given in total.

In the following, I will describe the weighting procedure.

Indices:

t = 1, 2

x = 1,…, 15

(1) In the first step, I count the number of items responded to by one participant.

$$\#\, i_k(x) \neq -77$$

(2) In the second step, I count the number of items responded to by all participants at the respective point of measurement.

$$\sum_{\mathrm{x}=1}^{15} \#\, i_k(x) \neq -77$$

(3) Then, I calculate factor k which represents the individual response rate relative to the absolute response rate.

$$k\,(x,t) = \frac{\#\, i_k(x) \neq -77}{\sum_{\mathrm{x}=1}^{15} \#\, i_k(x) \neq -77} \text{ with } \sum_{\mathrm{x}=1}^{15} \mathrm{k}\,(\mathrm{x},\mathrm{t}) = 1$$

(4) After that, I calculate the mean across all relevant items at the respective point of measurement for one participant.

$$mean_t\ (i_k(x) \neq -77)$$

(5) Factor k is finally multiplied with the individual mean. This results in a weighted new individual mean.

$$\mathrm{mean_t(x)} = \mathrm{k} * \ mean_t\ (i_k(x) \neq -77)$$

(6) The new weighted mean for the calculation of interest is then composed out of the sum of the weighted individual means.

$$\mathrm{mean_t} = \sum_{\mathrm{x=1}}^{15} [\mathrm{k} * \mathrm{mean_t}(i_k(x) \neq -77)]$$

For the calculation of effect sizes the standard deviation is relevant. Thus, I adapt the standard deviation to weighted means.

$$\mathrm{SD\ (t)} = \sqrt{\sum_{\mathrm{x=1}}^{15} \mathrm{k\ (x,t)} * [\mathrm{mean}\ (i_k(x) \neq -77) - mean\ (t)]^2}$$

Meta-expectations questionnaire

In the meta-expectations questionnaire neither “99” nor “-77” missings occur.

Role-expectation questionnaire

The role-expectation questionnaire contains one “99” missing for the baseline measurement. The separate post measures have little validity. Therefore, I exclude this one person from the analysis.

5. Results

Based on Kirkpatrick's evaluation model, the innovation promotor training's effectiveness is assessed on the first two levels. First, reaction level results are presented (5.1). Here, meta-expectations (5.1.1) and the satisfaction with training (5.1.2) are judged with the help of questionnaires and an interview (5.1.3). Afterwards, the results will be integrated and interpreted (5.1.4). Second, learning level results are presented (5.2). Here the knowledge and skills (5.2.1) as well as role-expectations (5.2.2) are assessed with questionnaires and an interview (5.2.3). Finally, the learning level results are interpreted (5.2.4).

5.1 Results on the reaction level

5.1.1 Meta-expectations questionnaire results

The meta-expectation questionnaire is used to find out what the participants expect the training to be like to be successfully qualified for their role as innovation promotor. Meta-expectations are assessed before and after half of the training to explore whether the meta-expectations change over the course of training.

Table 4 shows the average importance of the single meta-expectations and their clusters at the first (T1) and second point of measurement (T2). The ranks at the first and second point of measurement are also depicted to give an overview on the prioritization of the single meta-expectations.

Table 4: Average meta-expectation and ranking of meta-expectations before and after half of the training

	Mean_T1	**Mean_T2**	**Rank_T1**	**Rank_T2**
Cluster: interaction & networking	**4.33 (SD.37)**	**4.27 (SD.51)**	**1**	**1**
Networking with other innovation promotors	4.20 (SD.78)	3.93 (SD.80)	5	10
Clarification about the innovation promotor role	4.47 (SD.74)	4.33 (SD.82)	1	5

Exchange of experiences with other participants	4.33 (SD.62)	4.47 (SD.52)	2	2
Input by experts	4.33 (SD.72)	4.33 (SD.90)	3	3
Cluster: personal development	**3.93 (SD.57)**	**4.27 (SD.47)**	**3**	**1**
Self-reflection	3.93 (SD.80)	4.13 (SD.64)	9	8
Feeling of self-efficacy	3.93 (SD.92)	4.13 (SD.74)	10	7
Feedback from other participants & trainers	4.13 (SD.64)	4.53 (SD.64)	6	1
Reflection of self image and how the others perceive us	3.73 (SD.88)	4.27 (SD.70)	11	6
Cluster: methodological competence	**4.03 (SD.49)**	**3.98 (SD.63)**	**2**	**2**
Methodological manual	4.27 (SD.70)	3.93 (SD.80)	4	11
Transfer of expertise	4.00 (SD.54)	3.67 (SD.90)	8	12
Theoretical input	3.73 (SD.71)	4.00 (SD.66)	12	9
Practice-relevant exercises	4.13 (SD.99)	4.33 (SD 1.1)	7	4

Table 4 shows that, in general, the meta-expectations on the training are high. It also becomes obvious that the judgments vary a lot among the participants. Before the training, the participants' meta-expectations concentrate on the cluster "interaction and networking". These expectations reflect the desire to exchange information and to connect with other innovation promotors. In order to further develop "methodological competencies" participants expect the training to offer methodological manuals and practice-relevant exercises. The most important meta-expectation of all twelve single aspects refers to the "clarification about the innovation promotor role". For the successful qualification as innovation promotor "personal development" seems to be less important compared to the other two clusters. The ranking also displays that the participants' focus lies on "interaction and networking", followed by training of "methodological competencies" and finally "personal development". The control question that is asked at the second point of measurement reports, that all participants consider themselves on a promising way towards a successful ending of the program. At the second point of measurement, the importance of the cluster "interaction and networking" remains constant. In contrast, every single meta-expectation in the cluster "personal development" gains in importance. This cluster becomes equally important to the cluster "interaction and networking". Compared to

these two clusters, the meta-expectations on “methodological competencies” appear to be less important. Over the course of training, “feedback from other participants and the trainers” became increasingly important and is seen as the most effective aspect to a successful qualification as innovation promotor. Moreover, the ranking illustrates that also the meta-expectation on the “reflection of self image and how the others perceive us” ascends in the priority list. In contrast, the meta-expectation on “methodological manuals”, which has been of great interest at the first point of measurement, and the meta-expectation on “networking with other innovation promotors” lessen in importance.

In order to receive further support for my observations, I conduct the Wilcoxon signed-rank test. Table 5 shows that the gain in importance for the single meta-expectations “feedback from participants and trainers” and “reflecting the self image and how the others perceive us” is significant. The effect sizes report a moderate effect. The upgrade in rank of the cluster “personal development” is also significant. This change represents a moderate effect.

In contrast, the decrease in importance regarding the two meta-expectations is not significant. In brief, the statistical analyses partly support the observations made in descriptive data.

Table 5: Results of the Wilcoxon signed-rank test on selected meta-expectations and effect sizes

	z	**p (one-tailed)***	**r**
Networking with other innovation promotors	z = -1.414	p = .078	
Methodological manual	z = -1.508	p = .066	
Feedback from other participants & trainers	z = -1.897	p = .029*	r = - .35
Reflection of self image and how the others perceive us	z = -1.814	p = .035*	r = - .33
Cluster: personal development	z = -1.898	p = .029*	r = - .35

*Significant results are marked with a star.

5.1.2 Satisfaction questionnaire results

5.1.2.1 Results on global satisfaction

The satisfaction questionnaire is used to assess the participants' reaction to the program and to find out in how far their expectations are met. Moreover, I want to find out if the participants' satisfaction with the training differs among the five sessions.

In general, the global satisfaction is high. The average satisfaction for all five sessions is 4.32 (SD.36). Session four reaches the highest average score and participants agree on this evaluation. In contrast, session three and five reach the lowest values. With respect to the confidence intervals, it becomes obvious, that these two sessions are controversially discussed. Participants have contrasting opinions on these sessions. Session one and two reach positive evaluations and the opinions are rather consistent.

Figure 6 and table 6 show the average global satisfaction for all five sessions.

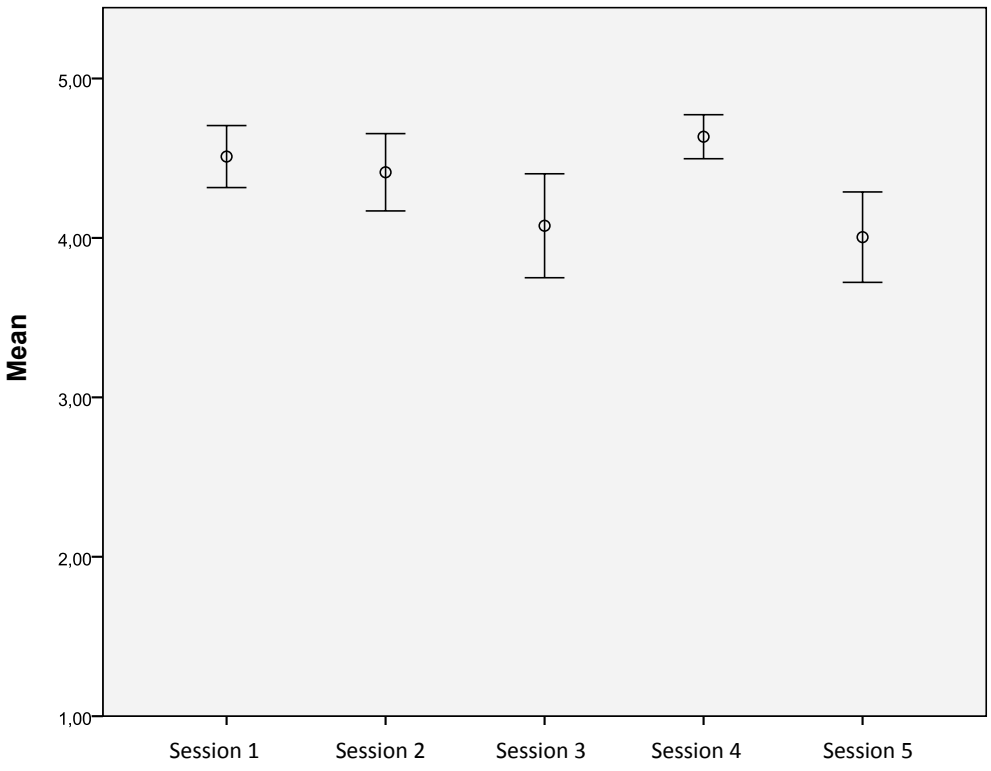

Figure 6: Bar diagram on global satisfaction depicting the mean and 95%- confidence interval (CI)

Table 6: Descriptive statistics on global satisfaction for all five sessions

N=15	**Mean**[2]	**CI (95%)**	**Minimum**	**Maximum**
Session 1	4.5 (SD.35)	[4.33; 4.67]	3.9	5.0
Session 2	4.4 (SD.44)	[4.19; 4.61]	3.5	4.8
Session 3	4.1 (SD.59)	[3.75; 4.34]	2.7	4.9
Session 4	4.6 (SD.25)	[4.51; 4.75]	4.1	5.0
Session 5	4.0 (SD.51)	[3.73; 4.26]	3.1	4.8

Due to the observation of different satisfaction evaluations, I realize the one-way repeated-measures ANOVA. The main effect becomes significant [$F (4, 56) = 13.85$, $p = .000$, $\eta^2 = .50$]. To further specify the main result, local tests report significant differences between session 1-3, 4-3, 1-5, 2-5 and 4-5.

The results imply that session three and five reach lower scores in satisfaction than the other three sessions. Moreover, the effect size reports a large effect and indicates that 50 percent of the overall variance in the satisfaction evaluation can be explained by the program.

For the assumption tests and the exact calculation on local tests please see Appendix D.

The global satisfaction is composed of the satisfaction evaluation with the content, trainer tandem and didactic. In the following the results are reported separately.

5.1.2.2 Results on satisfaction with the content

The evaluation on satisfaction with the content reflects if the participants received a good insight into the topic and if they got precious input for their future role.

Figure 7 and table 7 show the average satisfaction with the content for all five sessions. The satisfaction with the content stretches from medium to high. Again, session four is evaluated as the richest in substance, whereas session three gains the lowest evaluation of all sessions. Session one, two and five roughly share the same evaluation. It becomes obvious that the evaluation on all five sessions is inconsistent across the participants.

[2] The original five-point Likert scale in the satisfaction questionnaire includes a rating scale from 0-4. As PASW 18.0 would define the number '0' as a missing, I transliterated the rating scale into 1-5.

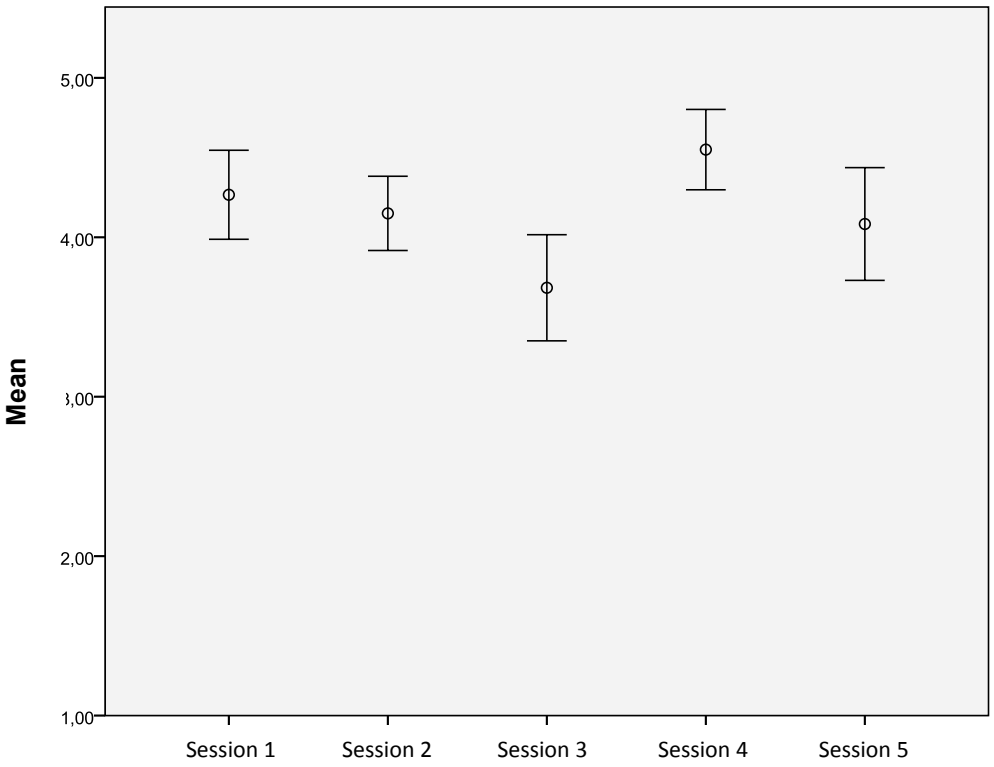

Figure 7: Bar diagram on satisfaction with the content depicting the mean and 95%-confidence interval (CI)

Table 7: Descriptive statistics on satisfaction with the content for all five sessions

N =15	**Mean**	**CI (95%)**	**Minimum**	**Maximum**
Session 1	4.3 (SD.50)	[4.00; 4.48]	3.0	5.0
Session 2	4.2 (SD.42)	[3.95; 4.35]	3.3	4.8
Session 3	3.7 (SD.60)	[3.40; 3.98]	2.5	5.0
Session 4	4.6 (SD.45)	[4.33; 4.75]	3.8	5.0
Session 5	4.1 (SD.64)	[3.77; 4.38]	2.8	5.0

Again the one-way repeated-measures ANOVA is realized to find support for my observation. The analysis reports a significant difference in the evaluation of the content between at least one of the five sessions [$F (4, 56) = 7.24$, $p = .000$, $\eta^2 = .34$]. Local tests specify this finding and report differences in satisfaction with the content for session 1-3 and 4-3. The statistical results support the observation that participants are less satisfied with the content of session three compared to the two favorite sessions. Moreover, the effect

size reports a large effect and indicates that 34 percent in the overall variance in the satisfaction evaluation with the content can be explained by the training content.

For the assumption tests and the exact calculation on local tests please see Appendix D.

Statements from the open questions at the end of the satisfaction questionnaire revealed some of the reasons for the different satisfaction evaluations. The main critique on the third session includes that the content does not sufficiently cover the topic. Especially, role-specific impulses are missed. The fifth session is particularly criticized for the imbalance in theoretical and practical input that lead to low practice-orientation. The lack of role-specific stimuli is also bemoaned. Moreover, an inter-related composition of contents will improve the comprehensiveness in the fifth session. The fourth session positively distinguishes from the other sessions, because the participants appreciate the alternating parts of theoretical and practical input and the many impulses that are given for their future role.

5.1.2.3 Results on satisfaction with the trainer tandem

The trainer tandem evaluation expresses in how far the participants' expectations on the trainers' professionalism are met.

Table 8 shows the average trainer tandem evaluation across all five sessions. In general, the average evaluation is quite high. In session three and five the participants' opinions diverge. Nevertheless, the average satisfaction remains very high.

Table 8: Descriptive statistics on satisfaction with the trainer tandem for all five sessions

N =15	**Mean**	**CI (95%)**	**Minimum**	**Maximum**
Session 1	4.7 (SD.31)	[4.58; 4.88]	4.1	5.0
Session 2	4.6 (SD.40)	[4.36; 4.76]	3.9	5.0
Session 3	4.4 (SD.62)	[4.04; 4.63]	2.8	5.0
Session 4	4.7 (SD.27)	[4.53; 4.80]	4.3	5.0
Session 5	4.3 (SD.55)	[3.98; 4.53]	3.4	5.0

I regard the highly positive trainer tandem evaluation as an acknowledgement of professionalism and therefore I do not take any further statistical analyses.

5.1.2.4 Results on satisfaction with didactic

The didactic evaluation refers to the practical relevance of training input and to the comprehensiveness of the presentation.

Figure 8 and table 9 show a great variation in the didactic evaluation. First, the means distinctly distinguish. Second, the opinions on the average evaluation stretch widely for almost every evaluation. Session four clearly reaches the highest score and is most consistent in evaluation. Session one and two share a rank. Session five gains the lowest satisfaction score, followed by session three. Visibly, session two is the most controversially discussed session. The view on session three and five is also discordant.

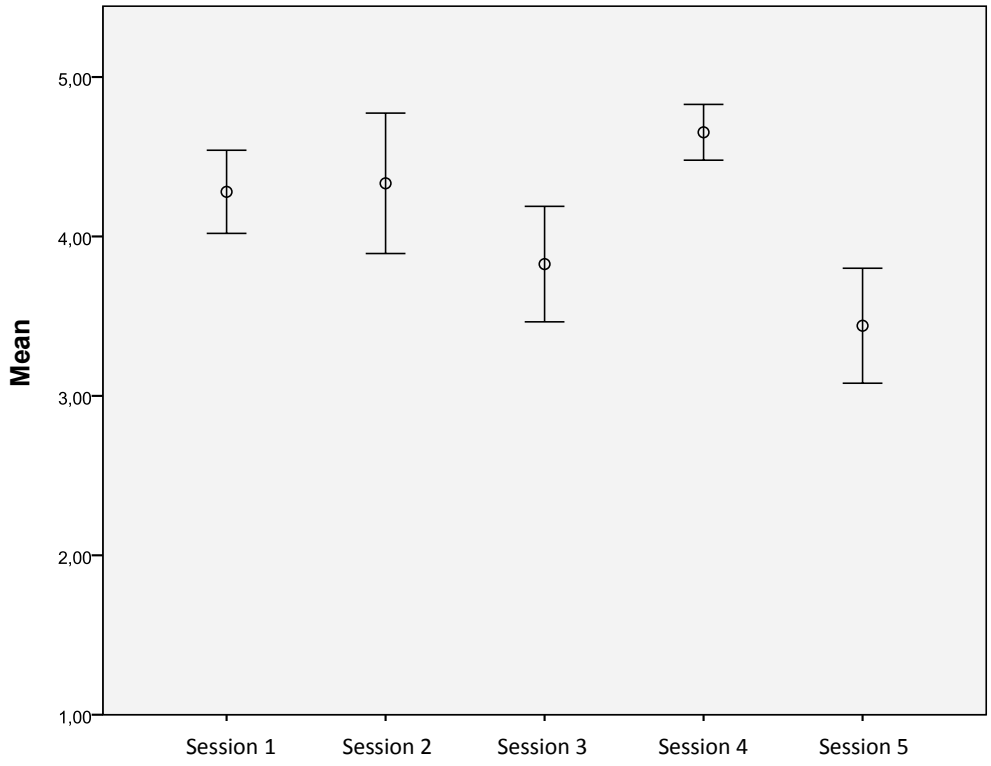

Figure 8: Bar diagram on satisfaction with didactic depicting the mean and 95%-confidence interval (CI)

Table 9: Descriptive statistics on satisfaction with didactic for all five sessions

N =15	**Mean**	**CI (95%)**	**Minimum**	**Maximum**
Session 1	4.3 (SD.47)	[4.04; 4.49]	3.2	5.0
Session 2	4.3 (SD.80)	[3.92; 4.71]	3.0	5.0
Session 3	3.8 (SD.65)	[3.48; 4.15]	2.6	4.6
Session 4	4.7 (SD.32)	[4.48; 4.80]	4.0	5.0
Session 5	3.4 (SD.65)	[3.12; 3.79]	2.4	5.0

For further clarification of the differences in satisfaction with didactic, I realize the one-way repeated-measures ANOVA. The main effect is significant [$F (4, 56) = 15.29$, $p = .000$, $\eta^2 = .52$]. Local tests further specify this finding and report significant differences between the evaluation on session 1-3, 4-1, 1-5, 2-5, 4-3 and 4-5. The result underlines that session four positively contrasts the other sessions and that session three and five come in last. 52 percent of variance in the overall satisfaction with didactic can be explained by different didactical approaches. This represents a large effect.

For the assumption tests and the exact calculation on local tests please see Appendix D.

Again remarks from the open questions give further hints for the different evaluations. Session five will profit from a greater variety of implemented methods and a more interactive setting. Also session three can be improved by integrating various methods that illustrate the contents. This will further improve the comprehensiveness of the input. Additionally, the link between the implemented method and its purpose for the future role has to be underlined. Session two is controversially discussed because the participants' expectations do not match the trainers' learning goals. Actually, the trainers succeed in providing a profound insight in knowledge production. Conversely, participants expect detailed discussions on the generation, promotion, evaluation and reward of ideas. In brief, a more practice-oriented session with the focus on idea management and its practical implementation, will meet the participants' expectations.

In contrast, session one is well designed. The participants agree that the trainers manage to create a good atmosphere to get to know each other and to lay the foundation for a trustful relationship. The variety of methods helps the participants develop an understanding of their future innovation promotor role and they feel well introduced to the topic. Session four

remains again the absolute favorite because the composition of the session and the variety of methods used, contribute to a well-conceived session.

5.1.3 Qualitative results from the interview

The aim of the interview is to add further insights on the reaction level that are not covered by the questionnaires. To me it is especially important to figure out facts about the participants' motivation and to get an impression on what makes the training special to them.

The motivation to participate originates primarily in the participants' curiosity for the topic and in their desire to exchange with other employees on the topic innovation.

In the participants' view, a distinctive feature of the program is the choice of theoretical input that helps to take a complex and systemic view on innovation processes. Moreover, the contents give a good insight into organizational change processes. Participants feel sensitized to the chances and hurdles in the innovation process and learn the meaning of constructive resistance. With respect to skills training, the participants stress that the relevance of communication and the exchange of information is brought into focus. Further mentioned is the intensive practice-orientation and the conscious promotion of collegial exchange and networking. Besides the opportunity to train professional competencies, the participants find a setting that stimulates personal development. They become aware to critically reflect behavior, to behave more esteeming towards others or to listened more carefully. They feel more self-conscious, competent and relaxed in their innovation promotor role.

5.1.4 Summary and interpretation of the reaction level results

The reaction level evaluation shows that participants come with a clear aim to the program. Their expectations concentrate on the wish to exchange with other experts and people of similar interests and on the need to clarify the future innovation promotor role. For the majority of sessions, the training meets the participants' expectations concerning the offer

of impulses for role clarification. Moreover, the participants agree on the fact, that within the context of the program, space for active interaction, mutual inspiration and reflection is created.

Detailed evaluations on content, trainer tandem and didactic result in medium to high values. This implies that the participants are basically satisfied with the program. Nevertheless, the observed variance in evaluation shows that the program still has potential and can be further improved. This is especially relevant for session three and five. Moreover, one has to pay attention to the observed ceiling effect in the meta-expectations and satisfaction assessments. The rating scale does not sufficiently differentiate between the evaluations in the upper portion of the scale. Possibly, evaluations are not appropriately depicted.

Furthermore, the evaluation reveals that the program includes useful methods and insightful input that have a beneficial effect on the participants' development. Interview data show that the participants especially appreciated the alternating parts of theoretical and practical input. They regard this contextual conception as supportive for the general understanding of input. In the participants' view, feedback from others is an essential means for successful qualification. Thus, this social learning mechanism, which is purposefully integrated by the trainers, proves to be beneficial. With respect to the didactical design, participants appreciate the high degree of practice-orientation and the variety of methods, which make learning transfer possible.

Overall, the pilot program is widely accepted. Especially, the participants' insight that training does not only foster their professional qualification but also their personal development emphasizes the training's quality and effectiveness as a personal development measure.

5.2 Results on the learning level

5.2.1 Results on the knowledge and skills questionnaire

The aim of the knowledge and skills questionnaire is to assess, if the training methods and implemented learning mechanisms contribute to the acquisition of role-specific knowledge and skills. To test this effect, a pre-post design is used consisting of a baseline evaluation at the beginning of the training and a second assessment after half of the training.

The evaluation on the two scales for theoretical and practical knowledge does not significantly correlate, neither at the baseline evaluation (T1) [r = .04, p = .89], nor at the second point of measurement (T2) [r = .38, p = .18]. Therefore, I present the results separately for the theoretical and practical level across the sessions.

5.2.1.1 Descriptive statistics on the knowledge and skills questionnaire

At the baseline evaluation, descriptive statistics report an average theoretical knowledge score of 3.79 (SD.30). Practical knowledge is slightly smaller with an average score of 3.23 (SD.42). Table 10 reports the single means for every session at the baseline evaluation.

Table 10: Descriptive statistics on theoretical and practical baseline knowledge

Session	Mean (standard deviation)	
	Theoretical knowledge	**Practical knowledge**
1: Role clarification	4.19 (SD.39)	3.76 (SD.65)
2: Idea management	3.82 (SD.40)	3.43 (SD.55)
3: Analysis of innovationprocesses	3.61 (SD.46)	3.04 (SD.63)
4: Framework conditions for innovation	3.76 (SD.52)	3.12 (SD.60)
5: Intervention to promote innovation	4.14 (SD.46)	3.65 (SD.62)
6: Moderation	3.86 (SD.53)	3.23 (SD.54)
7: Project management	3.64 (SD.45)	2.96 (SD.75)
8: Conflicts in innovation	3.54 (SD.53)	3.10 (SD.51)
9: Project evaluation	3.58 (SD.49)	2.97 (SD.55)

The theoretical knowledge at the second point of measurement reaches an average value of 4.04 (SD.46). Practical knowledge has risen to 3.48 (SD.46). Table 11 depicts the single means for every session at the second point of measurement.

Table 11: Descriptive statistics for theoretical and practical knowledge at the second point of measurement

Session	Mean (standard deviation)	
	Theoretical knowledge	**Practical knowledge**
1: Role clarification	4.44 (SD.48)	4.13 (SD.42)
2: Idea management	3.94 (SD.63)	3.54 (SD.61)
3: Analysis of innovation processes	4.14 (SD.51)	3.40 (SD.63)
4: Framework conditions for innovation	4.12 (SD.43)	3.42 (SD.45)
5: Intervention to promote innovation	4.27 (SD.42)	3.69 (SD.54)
6: Moderation	3.92 (SD.64)	3.36 (SD.77)
7: Project management	3.85 (SD.66)	3.37 (SD.57)
8: Conflicts in innovation	3.75 (SD.49)	3.34 (SD.45)
9: Project evaluation	3.94 (SD.61)	3.23 (SD.57)

5.2.1.2 Statistical analyses of the knowledge and skills questionnaire

The statistical analysis of the knowledge and skills questionnaire is directed by the following hypotheses.

H1a: The total score of the theoretical knowledge items at the second point of measurement is higher than the total score of the theoretical baseline knowledge items.

H2a: The total score of the practical knowledge items at the second point of measurement is higher than the total score of the practical baseline knowledge items.

The analyses support hypothesis 1a and 2a. They report a significant effect on the theoretical knowledge level [t (13) = 2.03, p = .03, d = .64] and on the practical knowledge level [t (13) = 2.2, p = .02, d=.57]. This learning effect is classified as large.

In the next step, I cluster the items. Cluster 1 includes sessions one through five which have already been trained. Cluster 2 comprises sessions six through nine which have not yet been realized. The average values for cluster 1 and 2 at both points of measurement are displayed in table 12.

Table 12: Descriptive statistics for cluster 1 and 2 at the baseline evaluation (T1) and second point of measurement (T2)

	Mean (Standard deviation)			
	Cluster 1		**Cluster 2**	
	Theoretical knowledge	Practical knowledge	Theoretical knowledge	Practical knowledge
T1	3.91 (SD.62)	3.39 (SD.85)	3.67 (SD.58)	3.04 (SD.40)
T2	4.16 (SD.43)	3.64 (SD.41)	3.82 (SD.53)	3.29 (SD.51)

The statistical analyses for cluster 1 and 2 are directed by the following hypotheses:

H1b: The total score for the theoretical knowledge items of cluster one is higher at the second point of measurement than at the baseline evaluation.

H1c: The total score for the theoretical knowledge items of cluster two do not differ at the two points of measurement.

H2b: The total score for the practical knowledge items of cluster one is higher at the second point of measurement than at the baseline evaluation.

H2c: The total scores for the practical knowledge items of cluster two do not differ at the two points of measurement.

The results of the dependent-means t-test are displayed in table 13.

For the assumption tests please see Appendix E.

Table 13: Results from the dependent-means t-test and effect sizes

	t	p *	Cohen's d
Cluster 1_theoretical level_T1 versus T2	t(13) = 1.979	p = .034*	d = .47
Cluster 1_practical level_T1 versus T2	t(13) = 2.066	p = .029*	d = .37
Cluster 2_theoretical level_T1 versus T2	t(12) = 1.440	p = .175	
Cluster 2_practical level_T1 versus T2	t(13) = 2.120	p = .054	

*Significant results are marked with a star.

The statistical analyses for cluster 1 support hypothesis 1b and 1c. A learning effect is detected regarding the training contents that have already been taught. The learning effect is classified as moderate. The statistical analyses for cluster 2 support hypotheses 2b and 2c. As assumed, a learning effect for the training contents that have not yet been implemented is detected.

To summarize, the statistical analyses report a substantial learning effect. The general hypotheses 1 and 2 mentioned in my research question are supported. In particular, the learning effect can be mirrored for the contents that have already been realized. This result further specifies my original hypotheses.

5.2.2 Results on the role-expectation questionnaire

The evaluation on role-expectations assesses the participants' view on their future role. I want to find out if role-expectations change due to the reflection of the role during the training.

In general, the judgments on the single role-expectations do not distinctively differ between the first and second point of measurement. The four clusters show very small changes. Some role-expectations remain on top of the ranking at both points of evaluation. Characteristic such as acceptances, openness, persistence, employee orientation, to connect ideas and knowledge and to listen carefully seem to be characteristics an innovation promotor shall posses. In contrast, other characteristics remain in the lower part of the ranking such as

creativity, marketing consciousness, curiosity, assertiveness and coaching. These attributes seem to be less relevant for the role of an innovation promotor.

Because descriptive statistics do not present any salient change in importance, neither for the single role-expectations nor the clusters, I do not conduct statistical analyses. The descriptive statistics for the single role-expectations and the four clusters are presented in Appendix F.

5.2.3 Qualitative results from the interview

On the learning level the interview is employed to gain a deeper insight in effective training methods and to get an impression in how far participants already integrated the training contents in their work field.

In general, the interactive training setting contributes to thorough reflection of the contents. 86 percent of participants emphasize that they benefit from the discussions in the heterogeneous group. Learning from others and feedback are also mentioned as useful techniques (66 percent, 50 percent). These training methods substantially contribute to role clarification: the coaching tool *role compass* (mentioned by 93 percent*)*, the exercise on the creation of the *ideal innovation promotor* and the theoretical explanations on the *promotor model* by Hauschildt & Chakrabarti (1988), (mentioned by 86 percent). Furthermore, insights are revealed by the exercises called *bridge-building* (47 percent), *Cockpit* (53 percent) and *project plan* (60 percent).

Already during training sessions, participants think of suitable transfer situations to implement training contents into practice and write them down in the learning diary (80 percent). The use of this booklet seems to pay. In total, 73 percent have already implemented training contents and methods (e.g. 40 percent have actively contribute to their role definition in their working environment, 35 percent have paid attention to transparent communication and an overall information flow). These changes in behavior have been realized by other organizational members in 27 percent. Besides regular training sessions, participants are active in processing and discussing training contents. 73 percent spend approximately one hour for preparation or follow-up work. 93 percent talk about the training contents with other colleagues and promotors in their firm. 60 percent reflect their

role with external people. The exchange takes place at least once a month, sometimes also once a week. To sum up, participants are motivated to shape their future role from the beginning and make a great effort to apply training contents in their working field.

5.2.4 Summary and interpretation of learning level results

Learning level analyses on the learning level find evidence for a substantive learning effect. More precisely, this effect is detected on the theoretical and practical knowledge level for the contents that have already been trained. These results underline that the implemented social and affective learning mechanisms prove effective. As a further source of impulses, the participants put emphasis on the interactive setting and the heterogeneous group. Moreover, participants remember insightful training methods from every session, which contribute to knowledge acquisition and role clarification. Also the learning diary proves to be a helpful means in processing training contents. Thus, the training concept integrates effective techniques and mechanisms that contribute to an intensive occupation with the role and foster the shaping of the innovation promotor role. Moreover, participants are encouraged to deal with training contents besides regular sessions and are motivated to apply their new competencies at work.

Concerning the role-expectations questionnaire the relatively consistent evaluations might imply that the characteristics are equally important. However, due to the observed ceiling effect, the evaluation remains undifferentiated. The participants' opinion is insufficiently depicted. Therefore, results are little conclusive.

6. Discussion

6.1 Summary of results

The aim of the innovation promotor training evaluation was to answer the central question: "How effective is training at encouraging the development of the innovation promotor role?" The current research reveals several indicators that suggest the training effectively qualifies participants for their professional role as innovation promotors.

The assessment on the reaction level shows that a demand for this training exists. The pilot training meets with participants' approval and fulfills their expectations. The satisfaction evaluation states that the trainers succeed in presenting relevant, role-specific information and that they encourage participants to shape their future role. The training's quality is also emphasized at the learning level. The interactive training concept and the purposefully integrated social and affective learning mechanisms contribute to the successful acquisition of theoretical and practical knowledge. Moreover, the intense practice orientation and the various tools that are offered to encourage learning transfer motivate participants to apply the content of the training to their work. The results with regard to both levels provide evidence of the training's quality; furthermore, these data legitimize it as personnel development measure. At the same time, the evaluation provides suggestions for the further increase of training effectiveness in order to develop the program's full potential.

In terms of the completeness of Kirkpatrick's evaluation model, future assessments must show how the acquired knowledge manifests itself in behavioral changes at the work place and whether its effectiveness can be depicted at an organizational level. The realization of these evaluations was already initialized within the context of a second master thesis. Moreover, the evaluation on reaction and learning level was repeated, which constitutes a third measurement for both levels. In combination with the present results, the complete data with assessments on all four levels of Kirkpatrick's evaluation model, will give a global view on the training's effectiveness.

Thus far, I can state that the results on the reaction and learning level confirm that thanks to the training the professional qualification as innovation promotor is encouraged. As a direct

implication of this result, my central research question can be positively answered: Training employees as innovation promoters is possible.

6.2 The relevance of results

6.2.1 Relevance for research

To the best of my knowledge, theoretical assumptions regarding the purposeful qualification of promotors were disproved or vague. Therefore, the theoretical implications that derive from the legitimization of the training create a new research perspective on innovation management and affect previous findings.

The present results assume that the innovation promotor acts independently of an isolated innovation project. Hence, the results build on Hauschildt and Schewe's (1997) theoretical consideration, that a process promotor is continuously involved in innovation management. The innovation promoter results can also be integrated into Hauschildt and Chakrabarti's (1988) promotor model. But, due to the professional qualification of the innovation promotor some theoretical assumptions have to be modified and adapted. The modifications primarily refer to the promotor role and to the promotor's contributions in the innovation process. Because the innovation promotor activities cover and even surmount the process promotor's role, the innovation promotor replaces him and assumes the central role in the innovation process. This also makes him a central figure in the communication network of internal and external stakeholders of the innovation process. Whether the innovation promotor could combine the process and relationship promotor's role into his activity must be considered. This discussion was already encouraged by Hauschildt (1997). Actually, this role combination makes sense regarding the relevance of intensive exchange with external stakeholders. The innovation promotor's central position and the high qualifications allow him to assume both roles. In the case of accepting this assumption, the promoter model would be extended from an intra-organizational to an inter-organizational model. Nevertheless, this theoretical assumption has to be thoroughly discussed and investigated on its practical relevance and feasibility.

With reference to Witte's (1973) three theorems, the division of labor theorem and the interaction theorem are still valid; however, the correspondence theorem must be modified. The focus on overcoming barriers is too narrow. The innovation promoter is qualified to undertake numerous tasks in addition to conflict-solving. Due to his professional qualifications, the innovation promotor's scope of action is wider and he is more involved in the innovation process than the process promotor. Moreover, the responsibilities that he takes are greater and the effect of his activities is more far-reaching. These assumptions imply that his activity is not limited to the development phase as Folkerts (2001) observed for the process promotor. Thus, investigations on the dynamics of the innovation promotor activity should be initiated.

Moreover, the biggest difference between the process and innovation promotor is the purposeful qualification to assume the professional role. Due to the deliberate transfer of role-specific knowledge and skills, the innovation promotor gains a further source of power. The innovation promotor must still rely on his extended information and communication network as well as his organizational expertise to pursue the process-oriented function. Therefore, Folkerts (2001) emphasis on work experience is relevant because as only with experience can the necessary network and profound organizational expertise be developed. However, in addition to these sources, the innovation promotor can use the source of knowledge. By that, the innovation promotor can be described as a powerful, key figure in innovation management. At this point, it is of interest to investigate the relationship between the innovation promotor and the power promotor. The innovation promotor represents a strong counterpart. Whether this leads to tension or rather cooperation should be subject to future investigations.

Furthermore, the qualification of the innovation promotor and thus the binding of role to a specific person, changes the assumption on spontaneous role taking. In fact, this assumption creates additional chances for promotor constellations such as the troika. Based on organizational expertise and the permanent activity in innovation management, the innovation promotor can initiate the development of the promotor constellation. In the course of his activity across several innovation projects, he gets to know qualified technology promotors and knows which power promotor to rely on. The development of the promotor constellation is now arranged more quickly compared to the self-organized procedure. Thus, the initiation of the innovation process can be accelerated. In contrast to the original

promotor model, the innovation promotor represents a stable element in the promotor constellation and no longer leaves the development of the promotor constellation to chance. The permanent position of the innovation promotor creates the theoretical perspective of institutionalized innovation management. If and how it works in practice must be investigated in the future. To summarize, with the new perspective concerning the theoretical assumptions, the validity of the promotor model increases because the model now explains how firms can strategically react to a close interaction in a dynamic environment.

Moreover, Folkerts's (2001) dynamic perspective results should be investigated regarding their relevance for the innovation promotor. Role quitting due to insufficient proficiency can be excluded due to the innovation promotor's qualification. Whether the innovation promotor assumes another role or whether several people assume the innovation promotor role must be investigated. Taking the innovation promotor's high degree of qualifications and his complex set of duties into consideration, any form of role extension or sharing seems unlikely. In fact, the innovation promotor likely demands role exclusivity. Alternatively, the innovation promotor might be closely connected to the project leader and assume or share his role for a period of time. Thus, one can build on Hauschildt's (1998) considerations that the process promotor assumes the project leader role in highly complex and strategic projects. Whether the innovation promotor assumes the project leader's role or whether they work side by side on projects should be investigated.

Under the assumption that the innovation promotor mostly corresponds with the process promotor, and in combination with Mansfeld's (2011) research on promotor profiles, the present finding provides relevant practical implications. In contrast, if one agrees with my theoretical consideration concerning the combination of the relationship and process promotor roles in the innovation promotor, then the innovation promotor profile should be reconsidered because the process and relationship promotor do not share a common profile.

To summarize, the theoretical modifications and new assumptions have identified that the step towards the institutionalization of innovation management is close. These impulses should now be further investigated and enriched.

6.2.2 Relevance for practice

The present results have a high practical relevance for firms and external consultants. In particular, they make a substantial contribution to personnel development. The opportunity of participating in the training and of being certified as innovation promotor brings new chances to the employee's advancement at the workplace. On the one hand, the employee himself can take the initiative to enroll for the program. On the other hand, the management or human resource department initiates the development into the innovation promotor role. If an employee already stood out in a positive manner through successful activity, then his abilities could be further developed to the benefit of the firm and the employee. In addition to operative personnel development, the possibility of strategic personnel development is provided. With this training, firms have the option of using a strategic tool to reach organizational aims such as sustainable innovativeness and efficient innovation management. The human resource department is able to actively delegate suitable employees for professional training participation. Thus, the problem of qualification, which is discussed at the beginning of the thesis, is solved. The present results give profound evidence for the training's effectiveness. Moreover, the firm can now rely on the availability of a qualified promoter who is permanently present in the firm. Firms are not required to bare uncertainty and planning insecurity any longer. Thus, firms can take responsibility for innovation management and will no longer depend on upcoming chances. This supposition implies that the possibility of qualifying employees as innovation promotors is closely related to the opportunity to influence strategic and deliberately designed innovation management. Moreover, if a firm decides to install the innovation promotor as a permanent key figure in innovation management, then it also decides for the establishment of an innovation-friendly organizational culture. The innovation promotor is qualified to analyze framework conditions for innovation and can draw the attention to certain flaws. Moreover, he can develop measures to remove these shortcomings. Over time, the innovation promotor sets the standards of innovation management; at the same time, he helps to install an innovation-promoting organizational culture. Thus, the innovation promotor also affects organizational development.

When firms become aware of the training, they can actively design organizational structures for the innovation promotor role. If the innovation promotor is certified, then the firm must

ensure that he can pursue his or her role in the firm. He has to be integrated into the firm. Moreover, he must be given the freedom to act. Given the information on the qualification program, the firm can actively advance and prepare for the integration of the innovation promotor. In particular, the firm can begin to sensitize the relevant managers to create space for the innovation promotor.

As an additional practical implication, the program can be used to incentivize employees. This training can be mentioned in employee performance reviews or conversations regarding career management. From the firm's perspective, the additional qualification represents a means to bind the employee to the firm.

Assuming that the results in Mansfeld's (2011) promoter profiles are integrated, the combination of these results and the training would allow for enhanced personnel selection. Provided that the innovation promotor's profile corresponds to the process promotor's profile, firms could actively search for the appropriate personality to the innovation promotor role. If a vacant key position must be filled, the profiles and the position matching provided by the training would direct the choice of candidate.

The relevance of the present results with regard to external consulting firms lies in the fact that these firms are now able to react to the professional innovation management demand. During consulting sessions, they can put attention on the existence of the program. Thus, they can solve the high demand on strategic innovation management options.

In fact, the present results are highly relevant for the artop GmbH. With the assurance of a qualitative personnel development measure and the legitimization of the training, the artop GmbH can profit from its first-mover advantage. Because such training is unique in Germany, this training is a pioneering qualification measure.

6.3 Discussion of methods

The present study is based on a relatively small sample. Despite this small size, the sample represents people of different age, position and branch. Moreover, small and medium-sized as well as big enterprises are represented. Furthermore, participants volunteered for this training; thus, sample selection was not left to chance. A quasi-experimental design with repeated measures was chosen. The design deviates from the ideal because a control group

was not used. Participants were not classified into different groups via randomization; rather, they were combined into a single experimental group. Consequently, the results cannot be interpreted unambiguously. Third variables and confounding variables might have influenced the results but were not controlled. This fact limits internal validity. In contrast, the external validity increases because the study was completed in the field (Schaper et al., 2008). At the same time, the external validity is restricted given the representativeness of the sample. According to Bortz and Döring (2006) the sampling of participants is relatively irrelevant in explorative approaches. In contrast, hypothesis-oriented assessments demand a careful sample composition. Thus, the results regarding the learning level must be considered with care. Concerning the explorative approach I used, the results only have an informative character. That means, if in the context of this exploration an interesting effect can be detected, "one can conduct a significance test on trial to complete this observation by precise quantitative data" (Bortz & Döring, 2006, p.379). These results can be used to formulate future hypotheses, but have to be confirmed in further assessments. As a consequence of the explorative strategy, the small sample and the absent control group, the results should be replicated in future investigations.

Concerning the evaluation model I choose, Kirkpatrick's evaluation model represents the most helpful and established program evaluation method (Schaper et al., 2008). However, it must be noted that this model explicitly concentrates on the training output. To classify the present results, one must consider that this evaluation exclusively refers to the training characteristic criteria. The present study evaluated whether conceptual and didactic features are used to compose a promising training concept and the extent to which the training affects the participants. However, individual or organizational aspects that influenced the participants before, during and after the training are not assessed or controlled, except for the trainee expectations. In other words, the detected effects cannot be attributed exclusively to training characteristics. Just to give an example, variables such as trainee motivation might also have an effect on the results. Moreover, the general weakness of this model lies in the theoretical assumption that the evaluation levels are arranged hierarchically. Studies by Alliger and Janak (1989) and Alliger et al. (1997) as well as a meta-analysis by Colquitt et al. (2000) have provided strong evidence that the correlation between the levels is small. Regarding my study, I can support these findings. Thus, for research the model's assumption regarding the hierarchical structure is unemployable.

To ensure research results with high validity and to minimize sources of error, a variety of assessments should be used. The present study applied a mixture of quantitative and qualitative methods, such as questionnaires and an interview. However, all the data collected were self-assessments. Stahl (1995) argues that employees are the best judges of what type of qualification they need and whether training serves that need. Wall et al. (2004) found evidence of high convergent and discriminate validity in self-ratings. However, these results derived from a single source; thus, single-informant biases can occur. This bias is especially relevant for the evaluation concerning the knowledge and skills questionnaire. First, self-ratings demand self-reflection. This meta-cognitive skill develops differently in each person and requires practice. Second, self-ratings produce insightful results when people answer honestly. Psychological confounders such as social desirability tendencies and self-serving biases can disrupt these preconditions. When people evaluate their own skills and knowledge, they provide answers that are congruent with their self-concept. The social desirability effect might also have played a role in the interview. Therefore, answers might have been distorted to avoid emotional and cognitive dissonances. Third, self-ratings depend on an individual's self-perception. This evaluation does not fulfill objective criteria. Self-ratings are purely subjective judgments in which every participant chooses his own reference point. There is no common reference group with which the participants can be compared. In brief, one must keep the subjective perspective in mind when judging the results.

Another point of discussion concerns the data level. From a strict statistical perspective, Likert scales theoretically produce ordinal data as one cannot presume that the difference between adjacent levels is equidistant. Nevertheless, I considered the data produced with the five-point Likert scale as interval data. It has become common practice to assume that Likert-scale categories are interval measurements (Jamieson, 2004; Blaikie, 2003; Russ-Eft, 2001). The rationale for doing so is that robust statistical tests are able to treat the data as interval; if the data are normally distributed, then the level of data they represent is less important (Russ-Eft, 2001). Furthermore, methodological studies using different analyses prove that Likert scales can be used as interval scales without the fear of specious results (Allerbeck, 1978). In my thesis, I mainly employ robust tests. Thus, the concern of data level diminishes for the benefit of greater test power and more concrete statements on the results.

Furthermore, some shortcomings must be mentioned regarding the questionnaires and the interview. As previously discussed, the five-point Likert-scale does not sufficiently differentiate responses in the upper portion of the scale and therefore leads to a ceiling effect in the meta-expectations, satisfaction and role-expectations questionnaire. The evaluations might have been more revealing if a seven-point Likert scale had been applied. In fact, Russ-Eft (2001) argued that the increase from five- to seven-point Likert scales increases response variability. Alternatively, a unipolar rating scale might be more appropriate for this evaluation. Except for the inappropriate rating scale, the questionnaires on meta-expectations and on satisfaction are sufficient instruments for the intended assessment. In its present form, I would not apply the questionnaire on role-expectation again. Asking participants about their views on their future role is essential. Given that the aim of the questionnaire should be to assess whether the training contributes to role clarification, this questionnaire should be modified. The number of items must be reduced from 30. Key functions for the future role should be presented with functions that are irrelevant for the role.

If participants learn to distinguish these characteristics over the course of training, then the questionnaire will serve its aim. Possibly, the modified questionnaire should be employed when participants had the chance to make practical experiences on relevant characteristics. Because this certainly takes time, the assessment should be postponed. With regard to the knowledge and skills questionnaire, I consider this instrument to be appropriate for the self-assessment of knowledge acquisition. Nevertheless, the evaluation could be improved by using e.g. simulations where knowledge and skills could be evaluated on more objective criteria. Moreover, I approve of the interview. As a qualitative method, it enriches the acquired quantitative data and reveals additional insights concerning trainee and training characteristics.

Some common limitations must be discussed with regard to repeated measures. Repeated measures are prone to study dropouts. This occurrence is also the case for the satisfaction questionnaire. A selective change in the sample occurs with several points of measurement. A different number of participants are present at every measurement. Because the present sample is small, I am ambitious of every evaluation. I impute missing values to include all participants in the analysis. Imputation can bias the data independent of the imputation method quality. Nevertheless, I accept the consequences of imputation due to the gain in

statistical power received by including all participants in the analysis. Moreover, I use different imputations, presented in the methods section in detail, to diminish the negative effects of imputation.

Moreover, three dilemmas are common for every longitudinal design. According to Carl Bereiter (1963), the three dilemmas are the overcorrection-undercorrection dilemma, the validity-reliability dilemma and the physicalism-subjectivism dilemma. Thus, these methodological limitations must also be considered within the context of my assessment.

The overcorrection-undercorrection-dilemma is closely connected to the regression toward the mean. When one variable is measured two times within the same group, the variance of individual values from the group mean is lower at the second point of measurement than at the first point. Methods to correct this effect exist; however, depending on which method one uses, the corrected value will be under- or overestimated, which is the crucial point of this dilemma. The impact of this effect is especially salient in pre-post designs in which the measurement is repeated only once (Baltes & Nesselroade, 1974). The effect loses its relevance with several points of measurement. Therefore, for the present results, this effect must be considered with regard to all but the satisfaction questionnaire. For the sake of interpretation, one cannot attribute the observed changes solely to the training.

The second typical repeated measures dilemma is the validity-reliability dilemma. In fact, this dilemma cannot be solved in the context of the classical test theory. In a design with two points of measurement, where the first and second point of measurement are strongly correlated, the reliability of the differential value decreases and the validity of single values increases. Vice versa, if the first and second measurements are weakly correlated, then the reliability of the differential value increases and the validity of single values decrease. In the first case, the dilemma suggests that the differential value does not reliably represent a true change. In the second case, the same change is not measured or different factors affected the values at the first and second measurement. The first case is especially relevant to interpret results for all but the satisfaction questionnaire. The second case must be considered for the satisfaction questionnaire. In general, one must keep in mind that the reported difference is not an absolute reflection of the true change for any questionnaire.

The third dilemma addresses the subjective meaning of change. In this case, the dilemma is especially apparent in the knowledge and skills questionnaire. When participants score their own knowledge, researchers must consider two aspects. First, the baseline value must be

taken into account. A two-point increase in knowledge has a different meaning for a participant with a baseline value of one compared with a participant who has a baseline value of three. Second, although baseline values might be identical for two participants, a knowledge increase of two does not necessarily represent the same acquisition of knowledge. Creating exact, quantifiable ranges that are also psychologically convenient to interpret is problematic. Therefore, the psychometric differences and the individual meaning for each participant are important to interpret. I try to address this problem with the interview in which participants provide their opinion concerning the learning effect. Moreover, further insights are acquired in open questions in the satisfaction questionnaire where participants are asked what they personally learn on the theoretical level, the practical level, or both.

6.4 Outlook

The present assessment provides many indicators of the pilot training's effectiveness. This training serves as an appropriate basis for additional trainings and paves the way for a promising training concept. However, future evaluations that include external assessments should specify and affirm the results primarily assessed in self-ratings. For future program evaluations one could use Kirkpatrick's evaluation model again as an orientation. This model has proved helpful in distinguishing the levels of evaluation and in classifying evaluation data. However, its focus on training characteristics could be extended. Therefore, I choose to build on Baldwin and Ford's (1988) idea. These authors assumed that training effectiveness is composed of three variables: the characteristics of the training, those of the trainee and organizational framework conditions. By integrating this classification in the survey design, a more complex assessment of training effectiveness can be realized. The assessment of trainee characteristics and organizational framework conditions is difficult to integrate into Kirkpatrick's evaluation model. Stufflebeam's (1972) context, input, process and product evaluation (CIPP model) is more appropriate. This context evaluation would integrate the organizational framework conditions. Relevant training effectiveness factors found in empirical studies include social support from management and colleagues (Tracey, Tannenbaum & Kavanagh, 1995), freedom to act (Howell, 2005) and transfer climate

(Rouiller & Goldstein, 1993). I would concentrate on these aspects and have management and employees assess them using a written or verbal inquiry. The input evaluation would concentrate on trainee characteristics. Martocchio (1992) provided empirical support that expectations influence training effectiveness. The meta-expectations questionnaire used in the present study would be a sufficient foundation for this assessment with a modified rating scale. The evaluation of participant motivation acquired in the interview should be integrated into the questionnaire as well. For a third trainee characteristic, I would include the personality trait, self-efficacy. Empirical evidence demonstrates its strong influence on training effectiveness (Colquitt, LePine & Noe, 2000; Machin & Fogarty, 2004). The process evaluation that serves as a formative evaluation might be realized by applying the satisfaction questionnaire. This questionnaire, which was used in the present study, proved to be a suitable method to assess the satisfaction with the training, its methods and contents; further the method gives an impression of the training's usefulness and whether trainee expectations are met. The product evaluation would concentrate on summative evaluation. Here, the knowledge and skills questionnaire can be integrated. The knowledge and skills questionnaire properly assessed the learning effect. Because it was difficult to create a convenient control group, I suggest using Haccoun and Hamtiaux's (1994) intern reference strategy. Applied to the present questionnaire, this suggestion means that training-irrelevant items would be integrated into the questionnaire. The evaluation of training-irrelevant measures should not change significantly in the analyses. Thus, the absent control group would be compensated for and the internal validity would be improved (Schaper et al., 2008). However, I would also include an objective measure in the self-rating questionnaire. I think of a case study, role play or scenario that can be quantified and evaluated using objective measures. One might develop different scenarios in which participants choose the best option possible as innovation promotors. This suggestion might obtain a more objective evaluation of knowledge and skills. The modified version of the role-expectations questionnaire could also be integrated in this evaluation to determine whether the training clarifies the role. Finally, Kirkpatrick's third and fourth levels might be integrated into product evaluation. On the behavior level, I can imagine using a 360-degree feedback to create a complex picture of the participants' behavioral modifications at the workplace. For the evaluation on the results level, appropriate key figures should be chosen such as the number of new ideas or customer satisfaction.

Moreover, Stufflebeam's (1972) model allows for the integration of Mansfeld's (2011) and Folkerts's (2001) research findings. Assuming that the innovation promoter profile is available, these relevant trainee characteristics might be assessed in the context of the input evaluation. In addition, Folkerts's hint regarding work experience might be integrated here. It would be interesting to test whether training effectiveness is improved for an experimental group that is consistent with the profile and work experience requirements, compared with a group in which these preconditions deviate. Practically, this comparison determines whether firms need to pay attention to employee characteristics when choosing them as training participants. Carefully selected participants might especially profit from the training.

Another idea worth testing is comparing groups of trained innovation promotors with those of process promotors who spontaneously assumed their role without professional qualifications. Research has provided evidence for the existence and effectiveness of promotors who assume their role spontaneously. The present study supports the notion that employees can be purposefully trained as innovation promotors. Assuming that this training substantially contributes to the participant's qualifications and results in a more professional and effective innovation process, the results should reflect this effect. This survey design would be able to test this assumption.

6.5 Conclusion

In my thesis, I have addressed a topic with high scientific and economic relevance. Innovations and their management play a fundamental role for the firm's competitiveness and profitability. I have attempted to provide insights on a systematic approach to strategic innovation management. Based on my theoretical considerations, I have developed the guiding research question: "Is it possible to purposefully train people as innovation promotor to foster the innovation process?" To approach this question, I scientifically analyzed and evaluated the effectiveness of the innovation promotor training. The main message of my work is that the training has resulted in significant learning effects. The program has provided the participants with role-specific knowledge and skills and has encouraged participants to shape their future role. The evidence on effectiveness legitimizes the training

as a personnel development measure. As a direct implication of this result, my guiding research question can be confirmed: Training employees as innovation promotors is possible. This is important and good news for academia and for practice. The scientific relevance of my results lies in the indication of an approach to strategic innovation management. Here, my work constitutes a pioneer contribution and thus opens this area as a new and challenging field for future research. The new theoretical assumptions result in direct practical implications. Firms can now take influence on innovation management. They do not have to rely on the right person in the right place at the right time. If a firm decides to install the innovation promotor as a permanent key figure in innovation management, then it also takes a strategic decision. With his permanent activity, the innovation promotor sets standards in innovation management and helps to install an innovation-friendly organizational culture. Thus he affects organizational development.

To the best of my knowledge, my work constitutes the first scientific evaluation of a promotor training. Therefore, my results have to be verified and specified in future investigations. In particular, more research has to be done which is beyond the scope of my thesis. However, the litmus test to the innovation promotor training is whether firms with trained innovation promotors effectively generate more marketable innovations than firms without trained promotors. Overall however, the present study illustrates that it is worth investigating the possibilities of purposeful qualification of promotors in order to gain new insights for research and business practices.

References

Allen, N. J., Meyer, J. P. & Smith, C. (1993). Commitment to Organizations and Occupations: Extension and Test of a Three-Component Conceptualization. *Journal of Applied Psychology*, 78(4), 538–551.

Allen, T. (1967). Communications in the Research and Development Laboratories. *R & D Management*, Vol.1, S.31-38.

Allerbeck, K. (1978). Meßniveau und Analysenverfahren – das Problem "strittiger Intervallskalen". *Zeitschrift für Soziologie, Vol* 7, S.199-214.

Alliger, G. M. & Janak, E. A. (1989). Kirkpatrick's levels of training criteria: Thirty years later. *Personnel Psychology*, Vol.42, p.331-342.

Alliger, G. M., Tannenbaum, S. I., Bennet, W., Traver, H. & Shotland, A. (1997). A meta-analysis of the relation among training criteria. *Personnel Psychology*, Vol. 50, p.341-258.

Allison, P.D. (2002). Missing Data. Thousand Oaks: Sage.

Alvarez, K., Salas, E. & Garofano, CM. (2004). An integrated model of training evaluation and effectiveness. *Human-Resource-Development Review,* Vol. 3, p.385-416.

Andrew, J.P., Manget, J., Michael, D.C., Taylor, A. & Zablit, H. (2010). Innovation 2010 – A Return to Prominence - and the Emergence to a New World Order. Boston Consulting Group Inc.

Andy Field, A. (2009). Discovering Statistics Using SPSS (Introducing Statistical Methods Series).Los Angeles: Sage Publications Ltd.

Arthur, W., Bennett, W., Edens, P.S. & Bell, S.T. (2003). Effectiveness of training in organizations: A meta-analysis of design and evaluation features. *Journal of Applied Psychology*, Vol 88, p. 234-245.

Arthur, W., Tubré, T., Paul, D. S., & Edens, P. S. (2003). Teaching effectiveness: The relationship between reactions and learning evaluation criteria. *Educational Psychology*, Vol.23, p.275– 285.

Bachmann, T., Runkel, R., Scholl, W. (2010). Ausbildung von Trainern, Coachs und Beraterinnen für Organisationen. In: Kanning, U. P., v. Rosenstiel, L., & Schuler, H. (Hrsg.).

Jenseits des Elfenbeinturms. Psychologie als nützliche Wissenschaft. Göttingen: Vandenhoek & Ruprecht.

Baldwin, T. T. & Ford, J. K. (1988). Transfer of training: A review and directions for future research. *Personnel Psychology, 41,* 63-105

Bandura (1979). Sozial-kognitive Lerntheorie. Stuttgart: Klett-Cotta
Bereiter, C.(1963). Some persisting dilemmas in the measurement of change. In: C.W. Harris (Ed.), Problems in measuring change. Madison: University of Wisconsin Press.

Bergmann, B. & Sonntag, K. (2006). Transfer: Die Umsetzung erworbener Kompetenzen in den Arbeitsalltag. In: Sonntag, K. (Hrsg.), *Personalentwicklung in Organisationen,* S. 355-388. Göttingen: Hogrefe.

Bessant, J. (2003). High-Involvement Innovation. West Sussex: John Wiley & Sons.

Blaikie. N. (2003). Analysing quantitative data. London: Sage Publications.

Bobkova, K. & Scholl, W. *(in Vorb.). Innovationserfolg durch evolutionäre Mechanismen der Produktion neuen Wissens. Humboldt-Universität zu Berlin.*

Bortz J., & Döring N. (2006). Forschungsmethoden und Evaluation für Human-und Sozialwissenschaftler. Springer, Berlin, Heidelberg, 4. Auflage.

Brockhoff, K., Chakrabarti, A. K. & Hauschildt, J. (1999).The Dynamics of Innovation: Strategic and Managerial Implications. Springer-Verlag

Brown, S., Seidner, C. (1998). Evaluating Corporate Training: Models and Issues. Kluwer Academic Publishers.

Burns, T. & Stalker, G.M. (1961). The Management of Innovation. London: Tavistock.

Busse, D. (2005). Innovationsmanagement industrieller Dienstleistungen – Theoretische Grundlagen und praktische Gestaltungsmöglichkeiten. Wiesbaden: Gabler.

Campbell, D.T. (1974). Evolutionary epistemology. In: Schilpp, P.A. (Ed.), The Philosophy of Karl Popper. La Salle: Opencourt.

Cannon-Bowers, J. A., Salas, E., Tannenbaum, S. I. & Mathieu, J. E. (1995). Toward theoretically based principles of training effectiveness: A model and initial empirical investigation. *Military Psychology, Vol. 7, p.*141-164.

Chen, J., Damanpour, F., & Reilly, R. R. (2010). Understanding antecedents of new product development speed: A meta-analysis. *Journal of Operations Management*, 28(1), 17-33.

Christensen, Clayton M. (2003). The innovator‘ s dilemma. 3.Aufl. New York 2003.
Clark, C.S., Dobbins, G.H. & Ladd, R.T. (1993). Exploratory Field Study of Training Motivation. *Group & Organization Management*, 18, 3, 9, 292-307

Clark, C.S., Dobbins, G.H. & Ladd, R.T. (1993). Exploratory Field Study of Training Motivation. *Group & Organization Management*, Vol.18 (3), p.292-307.

Cohen, J. (1988). Statistical power analysis for the behavioral sciences. 2. Auflage, Hillsdale, NJ: Lawrence Erlbaum.

Cohen, J. (1992): A power primer. Quant. Meth. Psychol. 112: 155–159.

Colquitt, J. A., LePine, J. A. & Noe, R. A. (2000). Toward an integrative theory of training motivation: A meta-analytic path analysis of 20 years of research. *Journal of Applied Psychology,Vol.85, p* 678-707.

Denison, D. & Mishra, K. (1995). Toward a Theory of Organizational Culture and Effectiveness. *Organization Science*, Vol. 6, No. 2. P.204-223.

Denison, D., Haaland, S. & Goelzer, P. (2003). Corporate Culture and organizational effectiveness: is there a similar pattern around the world? *Global Leadership*, Vol.3, 205-227.

Denison, D., Hooijberg R. & Quinn, R. (1995). Paradox and performance: Toward a theory of behavioral complexity in managerial leadership. *Organization Science, Vol* 6(5), p. 524–540.

Denison, D.R. (2006). Verbindung von Organisationskultur und unternehmerischem Erfolg: Ein kurzer Überblick. In: Lampe, M. & Schöler, G. Messen, werten, optimieren, Erfolg durch Unternehmenskultur. Ein Leitfaden für die Praxis, Bertelsmann Stiftung.

Disselkamp, M. (2005). Innovationsmanagement: Instrumente und Methoden zur Umsetzung im Unternehmen. Gabler Verlag.

Dörner, N., Gurtner, S. & Schefczyk, M. (2009). Overcoming resistance to innovations: an approach for the use of communication tools within the innovation process. *International Journal of Technology Marketing*, Vol. 4 (2/3), pp.199–216.

Ellonen, R., Blomqvist, K., & Puumalainen, K. (2008). The role of trust in organizational innovativeness. *European Journal of Innovation Management, 11*(2), 160-181.

Erpenbeck, J. & Rosenstiel, L. v. (Hrg.) (2007). Handbuch Kompetenzmessung. 2. Auflage, Stuttgart: Schäffer-Poeschel.

Folkerts, L. & Hauschildt, J. (2002). Personelle Dynamik in Innovationsprozessen - neue Fragen und Befunde zum Promotoren-Modell. *Die Betriebswirtschaft*, Vol. 62, p.7–23.

Folkerts, L. (2001). Promotoren in Innovationsprozessen. Empirische Untersuchung zur personellen Dynamik. 1.Aufl., *Betriebswirtschaftslehre für Technologie und Innovation,* Bd. 38, DUV: Wirtschaftswissenschaft.

Gabler Verlag (Herausgeber), Gabler Wirtschaftslexikon, Stichwort: Innovationsfähigkeit, http://wirtschaftslexikon.gabler.de/Archiv/82551/innovationsfaehigkeit-v5.html

Gemünden, H. G., Salomo, S. & Hölzle, K. (2007). Role Models for Radical Innovations in Times of Open Innovation. Creativity *and Innovation Management,* Jhg. 16, S. 408-421.

Gemünden, H.G. & Walter, A. (1995). Beziehungspromotoren – Schlüsselpersonen für zwischenbetriebliche Innovationsprozesse. In: Hauschildt,J. & Gemünden, H.G. (Hrg.), Promotoren – Champions der Innovation, Wiesbaden, Gabler.

Gerpott, T. J. (2005). Strategisches Technologie- und Innovationsmanagement – eine konzentrierte Einführung. Stuttgart: Schäffer-Poeschel.

Griffin, A., Hoffmann, N., Price, R. & Vojak, B. (2008). How Serial Innovators Navigate the Fuzzy Front End of New Product Development. No address in.

Haccoun, R. R. & Hamtiaux, T. (1994). Optimizing knowledge tests for interferring learning acquisition levels in single group training evaluation designs: The internal referencing strategy. *Personnel Psychology,* Vol.47, p.593-604.

Hamann, M. (2009). Prozessorientierte Strukturen in der Autohausorganisation. Eine empirische Analyse aus organisations- und arbeitswissenschaftlicher Sicht. In: Sträter, O. & Frieling, K. (Hrsg.). Schriftenreihe Personal- und Organisationsentwicklung, Band 6, Institut für Arbeitswissenschaft. Kassel: Universitäts Presse

Hauschildt, H., & Salomo, S. (2007). Innovationsmanagement. 4. Auflage, Verlag Vahlen.

Hauschildt, J. & Chakrabarti, A.K. (1988). Arbeitsteilung im Innovationsmanagement. In: Hauschildt,J. & Gemünden, H.G. (Hrg.), Promotoren – Champions der Innovation, Wiesbaden, Gabler.

Hauschildt, J. & Gemünden, H. G. (1999). *Promotoren - Champions der Innovation* (2. erw. Aufl.). Wiesbaden: Gabler.

Hauschildt, J. & Keim, G. (1997). Projektleiter als Prozesspromotoren, In: Hauschildt,J. & Gemünden, H.G. (Hrg.), Promotoren – Champions der Innovation, Wiesbaden, Gabler.

Hauschildt, J. & Schewe, G. (1997). Gatekeeper und Prozesspromotoren, In: Hauschildt,J. & Gemünden, H.G. (Hrg.), Promotoren – Champions der Innovation, Wiesbaden, Gabler.

Hauschildt, J. & Schewe, G. (2000). Gatekeeper and process promotor: key persons in agile and innovative organizations. *International Journal of Agile Management Systems*, Vol 2 (2), p. 96-103.

Hauschildt, J. (1993). Innovationsmanagement. 1.Auflage, Verlag Vahlen

Hauschildt, J. (1998). Promotoren – Antriebskräfte der Innovation. Mimeo Reihe BWL aktuell, Nr. 1, Universität Klagenfurt, Institut Wirtschaftswissenschaften.

Hauschildt, J. (2004). Innovationsmanagement. 3.Auflage, Verlag Vahlen.

Hauschildt, J., & Kirchmann, E. (1999). Zur Existenz und Effizienz von Prozeßpromotoren. In: Hauschildt, J., Gemünden, H.G. (Hrsg.) Promotoren. Champions der Innovaiton. 2.Auflage. Gabler Verlag

Hauschildt, J., & Salomo, S. (2008). Promotoren und Opponenten im organisatorischen Umbruch. In: Fisch, R., Müller, A., Beck, D. Veränderungen in Organisationen: Stand und Perspektiven. VS Verlag für Sozialwissenschaften.

Hauschildt, J., Chakrabarti, A. K. (1988). Arbeitsteilung im Innovationsmanagement - Forschungsergebnisse - Kriterien und Modelle. *Zeitschrift Führung und Organisation*, Vol.57 (6), S. 378-389.

Henard, D. H., & Szymanski, D. M. (2001). Why Some New Products Are More Successful than Others. *Journal of Marketing Research*, 38(3), 362 - 375.

Howell, Jane M. (2005). The Right Stuff: Identifying and Developing Effective Champions of Innovation. *Academy of Management Executive*, Vol.19, p.108–119.

Hussy, W., Schreier, M., Echterhoff, G. (2010). Forschungsmethoden in Psychologie und Sozialwissenschaften. Springer Verlag.

Jamieson, S. (2004). Likert scales: how to (ab)use them. *Medical Education*, Vol.38, p.1212-1218.

Kauffeld, S. & Grote, S. (2005). Teamfeedback mit dem Fragebogen zur Arbeit im Team. *Zeitschrift für Organisationsentwicklung*, Vol.24(4), S.72-77.

Kessler, E.H. & Chakrabarti, A.K. (1996). Innovation Speed: A Conceptual Model of Context, Antecedents, and Outcomes. *The Academy of Management Review,* Vol. 21, No. 4 , pp. 1143-1191.

Kirchler, E. (2008). Arbeits- und Organisationspsychologie. 2. Auflage, Facultas Verlags- und Buchhandlungs AG, Wien.

Kirkpatrick, D.L. (1996) Great Ideas Revisited. Techniques for Evaluating Training Programs. *Training & Development*, Vol 50 (1), p.54-59.

Kirkpatrick, D.L. (1998). Evaluating Training Programs. The Four Levels. Berrett-Koehler Publisher.

Labouvie, E. W., Bartsch, T. W., Nesselroade, J. R., & Baltes, P. B. (1974). On the internal and external validity of simple longitudinal designs. *Child Development*, Vol 45, 282-290.

Lechler, T. (1999). Was leistet das Promotoren-Modell für das Projektmanagement. In: Hauschildt,J. & Gemünden, H.G. (Hrg.), Promotoren – Champions der Innovation, Wiesbaden, Gabler.

Little, R.J.A. & Rubin, D.B. (2002). Statistical Analysis with Missing Data. New York: John Wiley, 2.Auflage.

Loevinger, J.(1976). Ego Development. San Fransisco: Jossey-Bass

Lücke, R., Katz, R. (2003). Managing Creativity and Innovation. Boston, MA: Harvard Business School Press.

Machin, M. A. & Fogarty, G. J. (2004). Assessing the antecedents of transfer intentions in a training context. *International Journal of Training and Development, Vol.*8, p.222-236.

Mansfeld, M. (2011). Individuen im Innovationsmanagement. Gabler Verlag.

Martocchio, J. J. (1992). Microcomputer usage as an opportunity: The influence of context in employee training. *Personnel Psychology,* Vol. 45, p.529-552.

Martocchio, J. J. (1994). Effects of conceptions of ability on anxiety, self-efficacy, and learning in training. *Journal of Applied Psychology*, Vol.79, p 819-825.

Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of Management Review, Vol. 20*, 709-734.

Meyer, A. D., Tsui, A.S. & Hinings, C. R. (1993). Configurational Approaches to Organizational Analysis. *Academy of Management Journal*, 36(6), 1175–1195.

Miron, E., Erez, M. & Naveh, E. (2004). Do personal characteristics and cultural values that promote innovation, quality and efficiency compete or complement each other? *Journal of Organisational Behaviour*, Vol 25 (2), p. 175-199.

Mirow, C., Hölzle, K. & Gemünden, H. G. (2007). Systematisierung, Erklärungsbeiträge und Effekte von Innovationsbarrieren. *Journal für Betriebswirtschaftslehre*, Jhg. 57, S.101-134.

Noe, R.A. & Schmitt, N. (1986). The influence of trainee attitudes on training effectiveness: test of a model. *Personnel Psychology*, Vol.39, p.497-523.

Piatier, A., 1984. Barriers to Innovation. Frances Pinter, London.

Piderit, S. (2000). Rethinking Resistance and Recognizing Ambivalence: A Multidimensional View of Attitudes Toward an Organizational Change. *Academy of Management Review,* Vol. 25 (4), p. 783-794.

Reicherts, H.-J. & Krumkamp, J. (1987). Praktische Ansätze betrieblicher Weiterbildungskontrolle. In: Blomber, P.v. et al. (Hg.). Weiterbildung im Wandel: konzeptionelle udn methodisch Innovationen. Hamburg: Windmühle, S. 263-281.

Rogers, M. (1998). The Definition and Measurement of Innovation. Mimeo, Melbourne Institute Working Paper No. 10/98 from the 'Performance of Australian Enterprises' project.

Rost, K., Hölzle, K., & Gemünden, H. (2007). Promotors or Champions? Pros and Cons of Role Specialisation for Economic Process. SBR 59, p.340-363.

Rouiller, J. Z. & Goldstein, I. L. (1993). The relationship between organizational transfer climate and positive transfer of training. *Human Resource Development Quarterly,* Vol.4(4)*, p.* 377-390.

Rousseau, D. M., & Tijoriwala, S. A. (1999). What's a good reason to change? Motivated reasoning and social accounts in promoting organizational change. *Journal of Applied Psychology, 84*(4), 514-528.

Rowold, J., Hochholdinger, S. & Schaper,N. (2008). Evaluation und Transfersicherung betrieblicher Trainings. Göttingen: Hogrefe.

Russ-Eft, D., Preskill, H. (2001). Evaluation in Organizations. A systematic approach to enhancing learning, performance and change. Cambridge, Massachusetts: Perseus Publishing.

Sauber, T. (2003). The Innovations Strategy Development Process Based on Innovation Architectures. In: Tschirky, H., Jung, H.-H., & Savioz, P. (Hrsg.). Technology and Innovation Management on the Move, Zürich: Verlag Industrielle Organisation.

Sawert, S. (2004). Konzeption eines Evaluationsinstrumentes für Trainerausbildungen. Unveröffentlichte Diplomarbeit, Humboldt Universität zu Berlin.

Schafer, J.L. & Graham, J.W. (2002). Missing Data: Our View of the State of the Art. Psychological Methods, 7(2),147-177.

Schein, E.H. (1985). Organizational culture and leadership. San Fransisco, Ca: Jossey-Bass.

Schewe, G. (1994). Successful innovation management: An integrative perspective. *Journal of Engineering and Technology Management* , Vol 11, p.25-53.

Schmeisser W. (1984). Erfinder und Innovation. Dissertation, Universität Duisburg.

Scholl, W. (2004). Innovation und Information. Wie in Unternehmen neues Wissen produziert wird. Göttingen: Hogrefe.

Scholl, W. (2011). Innovation durch Mitbestimmung. mimeo, Hans-Böckler Stiftung

Scholl, W., & Kunert, S. (2011). Mode oder Methode? Die Bedeutung von Vertrauen für Innovationsprozesse. *Zeitschrift für innovative Arbeitsgestaltung und Prävention*, 4/2011, 18-20.

Schon, D.A. (1963). Champions for Radical New Inventions. *Harvard Business Review*, Vol. 41, p.77-86.

Schumpeter, J. (1912). Theorie der wirtschaftlichen Entwicklung. Duncker & Humblot.

Scott, S.G. & Bruce, R.A. (1994). Determinants of innovative behaviour: a pathmodel of individual innovation in the workplace. *Academy of Management Journal,* Vol.37 (3), p. 580-607.

Six, F., & Sorge, A. (2008). Creating a high-trust organization: An exploration into organizational policies that stimulate interpersonal trust building. *Journal of Management Studies, 45*(5), 857-884.

Stahl, T. (1995). Selbstevaluation. Ein Königsweg zur Qualitätssicherung in der Weiterbildung? In: Feuchthofen, J. E. & Severing, E. (Hrsg.): Qualitätsmanagement und Qualitätssicherung in der Weiterbildung. Berlin.

Stufflebeam, D. L. (2000). The CIPP model for evaluation. In: D.L. Stufflebeam, G.F. Madaus & T. Kellaghan (Eds.), Evaluation models. Boston: Kluwer Academic Publishers.

Tidd, J., Bessant,J . & Pavitt, K. (2005). Managing Innovation: Integrating Technological, Market and Organizational Change. John Wiley & Sons, 3rd Edition.

Tracey, J. B., Tannenbaum, S. I. & Kavanagh, M. J. (1995). Applying trained skills on the job: The importance of the work environment. *Journal of Applied Psychology,* Vol. 80 (2), 239-252.

Tränkle, U. (1983). Fragebogenkonstruktion. In: H. Feger, J. Bredenkamp (Hrsg.). Datenerhebung. Enzyklopädie der Psychologie, Band B, I,2, (S.222-301). Göttingen: Hogrefe 1983.

v. Rosenstiel, L. (2003). Grundlagen der Organisationspsychologie. 6., überarbeitete Auflage. Schäffer-Poeschel, Stuttgart

Wall, T.D., Michie, J., Patterson, M., Wood, S.J., Sheehan, M., Clegg, C.W. & West, M. (2004). On the validity of subjective measures of company performance. *Personnel Psychology*, Vol. 57, S. 95–118.

Witte, E. (1973). Organisation for Innovationsentscheidungen. Das Promotoren-Modell. Göttingen: Schwartz.

A Questionnaire

A.1 Zufriedenheitfragebogen, deutsche Originalversion

Beurteilungsbogen für Veranstaltungen der Ausbildung zum/r Innovationspromotor/in

Beim ersten Teil dieses Fragebogens geht es darum, wie Sie die Modulinhalte einschätzen.	Stimmt ganz und gar nicht				Stimmt voll und ganz
	0	1	2	3	4
1. Meine Erwartungen an die vermittelten Inhalte wurden erfüllt.	☐	☐	☐	☐	☐
2. Das Modul hat einen guten Einblick in das Themengebiet ermöglicht.	☐	☐	☐	☐	☐
3. Der Stoff war so interessant, dass ich eine weitere Vertiefung für notwendig halte.	☐	☐	☐	☐	☐
4. Ich habe viele Anregungen für eine spätere Tätigkeit als Innovationspromotor/in bekommen.	☐	☐	☐	☐	☐

Bei den nun folgenden Fragen geht es um Ihre Einschätzung des/ der Seminarleiters/in.	0: Stimmt ganz und gar nicht … 4: Stimmt voll und ganz									
	Seminarleiter/in 1 Name:_____					Seminarleiter/in 2 Name:_____				
	0	1	2	3	4	0	1	2	3	4
1. Meine Erwartungen an den/die Seminarleiter/in wurden erfüllt.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
2. Bei diesem/r Seminarleiter/in würde ich gerne nochmals an einem Modul teilnehmen.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
3. Der/die Seminarleiter/in hat den Stoff anschaulich und verständlich mit uns erarbeitet.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4. Der/die Seminarleiter/in ging auf die Bedürfnisse der Teilnehmer ein.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
5. Fragen und/oder kritische Anmerkungen wurden von dem/der Seminarleiter/in stets aufgenommen.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
6. Der/die Seminarleiter/in hat die Diskussion gefördert und zu guten Ergebnissen geführt.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
7. Der/die Seminarleiter/in war bei allen Themen gut vorbereitet.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
8. Der/die Seminarleiter/in hat mit verschiedenen Methoden die Inhalte sehr abwechslungsreich gestaltet.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Wie erleben Sie die Darstellung des vermittelten Stoffes?	Stimmt ganz und gar nicht				Stimmt voll und ganz
	0	1	2	3	4
1. Die theoretischen Ausführungen waren informativ und verständlich.	☐	☐	☐	☐	☐
2. Theorie und praktische Beispiele standen in einem guten Verhältnis.	☐	☐	☐	☐	☐
3. Es wurde gezielt darauf hingearbeitet, das Gelernte auch in die Praxis zu übertragen.	☐	☐	☐	☐	☐
4. Man konnte dem Stoff des Moduls leicht folgen.	☐	☐	☐	☐	☐
5. Man konnte durch die Übungen richtig in die Thematik eindringen und sich mit ihr persönlich auseinandersetzen.	☐	☐	☐	☐	☐

Hier bitten wir Sie um konkrete Rückmeldungen!

Positive Aspekte (Besonders gefallen hat mir..., Besonders wichtig war für mich..., Besonders informativ war ....)

Negative Aspekte (In diesem Modul fehlten mir ..., Zu kurz kam mir..., Besonders geärgert hat mich ....)

Was haben Sie persönlich für sich gelernt – theoretisch und/oder praktisch?

Modul: .....

A.2 Lernfragebogen, deutsche Originalversion

Liebe Teilnehmerin, Lieber Teilnehmer,

Wie angekündigt erfolgt nach der ersten Hälfte der Ausbildung eine weitere Datenerhebung.

Der folgende Fragebogen besteht aus drei Teilen, die du bereits kennst.

Im ersten Abschnitt geht es darum zu erfassen, zu welchen Themen du deine Kenntnisse erweitert und zusätzlich praktische Erfahrungen im Berufsalltag gesammelt hast.

Im zweiten Teil geht es um den idealen Innovationspromotor. Auch hier interessiert, wie deine Beurteilung nach der ersten Hälfte der Ausbildung ausfällt.

Der dritte Teil greift die Metaerwartungen auf, die du bereits vor dem Ausbildungsbeginn zum ersten Mal eingeschätzt hast.

Um deine Anonymität zu wahren, bitte ich dich, wie gewohnt deinen persönlichen Code zu notieren. Gleichzeitig stellt die Befragungssoftware von *Unipark* sicher, dass ein Rückschluss auf deine IP-Adresse ausgeschlossen ist.

Die Beantwortung des Fragebogen wird ca. 20 Minuten in Anspruch nehmen. Bitte antworte spontan und verlasse dich auf dein Gefühl, wenn du dir einmal nicht so sicher bist. Es geht lediglich um deine ganz persönliche Einschätzung.

Dein persönlicher Code setzt sich zusammen aus:

1. den ersten zwei Buchstaben des Vornamens deiner Mutter
2. dem Tag (zweistellig) deines Geburtsdatums
3. dem zweiten & dritten Buchstaben deines Vornamens

Beispiel: Maria; 25.05.; Anna = MA25NN

Bitte trage deinen persönlichen Code in dieses Kästchen ein:

Im ersten Teil geht es darum zu erfahren, inwiefern du Kenntnisse über bestimmte Themen besitzt und inwiefern du damit bereits Erfahrungen in deinem Praxisalltag gesammelt hast. Dazu wirst du Begriffe sehen, die sich alle aus den Inhalten der Ausbildungsmodule ergeben.

Diese Begriffe sind auf einer Skala von 1 – 5 einzuschätzen.

1 = trifft überhaupt nicht zu
2 = trifft ein wenig zu
3 = trifft teilweise zu
4 = trifft überwiegend zu
5 = trifft absolut zu

Zudem gilt es diese Einschätzung bezüglich zwei Aussagen abzugeben.

„Kenne ich." - Das ist die erste Aussage, die erscheint. Hier geht es um deine persönliche Einschätzung, inwiefern du mit diesem Thema vertraut bist, darüber etwas gelesen oder erfahren hast. Insbesondere ist hier der Bezug zum Thema Innovation wichtig. Inwieweit ist dir die Bedeutung des Themas für Innovationen bewußt.

„Setze ich um." – Das ist die zweite Aussage, die es einzuschätzen gilt. Hierbei geht es um die tatsächliche Anwendung im Arbeitsalltag. Dabei kann es sich um gesammelte Erfahrungen mit einer Methode, die aktive Umsetzung einer Technik oder den Transfer eines theoretischen Ansatzes in die Praxis handeln.

Um die Einschätzung zu starten, geh bitte auf die nächste Seite.

	Trifft überhaupt nicht zu	Trifft ein wenig zu	Trifft teilweise zu	Trifft überwiegend zu	Trifft absolut zu
Lernen aus Fehlern.					
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Nachhaltige Konfliktbewältigung					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Strategische Personalentwicklung					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Horizontale & vertikale Kommunikation					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Aktive Unterstützung von Innovationsprozessen					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Innovationsförderliche Arbeitsplatzgestaltung					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o

	Trifft überhaupt nicht zu	Trifft ein wenig zu	Trifft teilweise zu	Trifft überwiegend zu	Trifft absolut zu
Kompetenzentwicklung					
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Vertrauensförderliche Maßnahmen					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Motivieren					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Nachhaltigkeit					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Mitarbeiterorientierung					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Projektmanagement					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o

	Trifft überhaupt nicht zu	Trifft ein wenig zu	Trifft teilweise zu	Trifft überwiegend zu	Trifft absolut zu
Selbstreflexion					
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Individueller Wissenserwerb					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Gruppensteuerung					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Systematisches Monitoring					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Angemessener Umgang mit Widerständen					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Gesprächsführung					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o

	Trifft überhaupt nicht zu	Trifft ein wenig zu	Trifft teilweise zu	Trifft überwiegend zu	Trifft absolut zu
Projektevaluation					
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Konfliktphasen bei der Lösung beachten					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Lernen in und mit der Organisation					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Visualisierung					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Moderation					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Interorganisationale Kooperation					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o

	Trifft überhaupt nicht zu	Trifft ein wenig zu	Trifft teilweise zu	Trifft überwiegend zu	Trifft absolut zu
Unternehmerisches Handeln					
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Veränderungen initiieren					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Mitarbeiterbeteiligung					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Konstruktiver Umgang mit Rückschlägen					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Selbstmanagement					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Zweckvolle Konflikthandhabung					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o

	Trifft überhaupt nicht zu	Trifft ein wenig zu	Trifft teilweise zu	Trifft überwiegend zu	Trifft absolut zu
Strategische Projektplanung					
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Lernen im Team					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Systematisches Bewerten von Innovationen					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Analyse von Innovationsprozessen					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Ideenaustausch					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o
Aktive Innovationsförderung					
	1	**2**	**3**	**4**	**5**
Kenne ich.	o	o	o	o	o
Setze ich um.	o	o	o	o	o

Sicher erinnerst du dich noch an den idealen Innovationspromotor, den du gemeinsam in der Gruppe im ersten Modul erstellt hast.
Bitte schätze hier ein, welche Wichtigkeit die einzelnen Eigenschaften/ Aktivitäten aus deiner persönlichen Sicht für einen Innovationspromotor besitzen.

	Trifft überhaupt nicht zu	**Trifft ein wenig zu**	**Trifft teilweise zu**	**Trifft überwiegend zu**	**Trifft absolut zu**
	1	**2**	**3**	**4**	**5**
Kreativität	o	o	o	o	o
Mut	o	o	o	o	o
Beharrlichkeit	o	o	o	o	o
Guidance (Hilfe zur Selbsthilfe)	o	o	o	o	o
Systemverständnis	o	o	o	o	o
Gut zuhören können	o	o	o	o	o
Informiert (intern, extern)	o	o	o	o	o
Offenheit	o	o	o	o	o
Andere motivieren	o	o	o	o	o
Neugierig	o	o	o	o	o
Ideen & Wissen zusammenbringen	o	o	o	o	o
Coach	o	o	o	o	o
Moderator	o	o	o	o	o
Marketingbewußtsein	o	o	o	o	o
Begeisterungsfähigkeit	o	o	o	o	o
Analytische, strukturelle Fähigkeiten	o	o	o	o	o
Empathie	o	o	o	o	o
Mitarbeiterverständnis	o	o	o	o	o
Zugang/ Akzeptanz zu/von Entscheidungsträgern	o	o	o	o	o
Gespür für Timing	o	o	o	o	o
Kompetentes Auftreten	o	o	o	o	o
Netzwerker intern/ extern	o	o	o	o	o
Akzeptanz im Unternehmen	o	o	o	o	o
Dynamisch	o	o	o	o	o
Selbstbewußtsein	o	o	o	o	o
Akzeptierter Ansprechpartner für Kollegen & Geschäftsführung	o	o	o	o	o
Teamfähigkeit	o	o	o	o	o
Kommunikationstalent	o	o	o	o	o
Durchsetzungsvermögen	o	o	o	o	o
Vertrauen	o	o	o	o	o

Gleich hast du es geschafft.

Bitte schätze im folgenden ein, welche Faktoren deiner Meinung nach für einen erfolgreichen Abschluss der Ausbildung zum Innovationspromotor wichtig sind.

	unwichtig	**weniger wichtig**	**teilweise wichtig**	**eher wichtig**	**sehr wichtig**
Vernetzung mit anderen Innovationspromotoren	o	o	o	o	o
Selbstwirksamkeit	o	o	o	o	o
Feedback von anderen TN & Trainern	o	o	o	o	o
Methodische Leitfäden	o	o	o	o	o
Erfahrungsaustausch mit anderen	o	o	o	o	o
Spiegelung von Selbst- & Fremdbild	o	o	o	o	o
Praxisübungen	o	o	o	o	o
Klarheit über die Rolle eines Innovationspromotors	o	o	o	o	o
Vermittlung von Fachwissen	o	o	o	o	o
Theoretische Grundlagen	o	o	o	o	o
Selbstreflexion	o	o	o	o	o
Fachinput von Experten	o	o	o	o	o

Siehtst du dich auf einem guten Weg die Ausbildung erfolgreich abzuschließen?

Ja o Nein o

Du hast es geschafft!

Vielen Dank für deine Teilnahme!

B Interview

1. Was war für dich der entscheidende Impuls/ auslösende Moment an der Ausbildung teilzunehmen?
2. Was waren bisher für dich die wichtigsten Erkenntnisse/ Schlüsselmomente der Ausbildung?(3 Nennungen)
3. Welche Inhalte/ Anregungen/ Ideen der Ausbildung hast du bereits umgesetzt? Nenne mir ein Beispiel. Wie hat sich das in deinem Verhalten widergespiegelt?
4. Haben andere MA/ Projektmitglieder bereits eine Veränderung in deinem Verhalten/ Auftreten bemerkt? Erinnerst du dich an Bemerkungen anderer dazu?
5. Was hat dich in der Ausbildung am meisten unterstützt, deine Rolle als Innovationspromotor zu gestalten?
6. Wieviel Zeit über die Ausbildung hinaus, hast du mit Themen des Innovationspromtors verbracht? Was hast du getan, um die dir wichtigen Inhalte in deinen Arbeitsalltag zu integrieren?
7. Unterhälst du dich regelmäßig mit einer FK/ Vertrauens- oder Bezugsperson, mit der du deine Rolle reflektierst und diskutierst?
8. Wenn dich ein guter Freund fragt, was ihn in der Ausbildung erwartet, welchen Aspekt würdest du hervorheben/ betonen?
9. Welche persönliche Entwicklung hast du durch die Ausbildung neben deiner beruflichen Qualifikation als Innovationspromotor festgestellt?

C English Version of questionnaires and the interview

Satisfaction questionnaire

Evaluation sheet on the training as innovation promotor

In the first part, we ask you to evaluate the content of the session.	Disagree				Agree
	0	1	2	3	4
1. My expectations on the content were met.	☐	☐	☐	☐	☐
2. The session provided a good insight into the topic.	☐	☐	☐	☐	☐
3. The content was that interesting that I consider further reading on the topic.	☐	☐	☐	☐	☐
4. I received plenty of impulses for my future role as innovation promotor.	☐	☐	☐	☐	☐

In the following the trainers should be evaluated.	0: Disagree				4: Agree					
	trainer 1 name:_____					trainer 2 name:_____				
	0	1	2	3	4	0	1	2	3	4
1. My expectations on the trainer were met.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
2. I would like to participate in a further session with this trainer.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
3. The trainer ventilated the topic with us in a vivid and comprehensible way.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4. The trainer considered the participants'needs.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
5. Questions and critical remarks were always noticed by the trainer.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
6. The trainer encouraged discussions and drew good conclusions.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
7. The trainer was well-prepared.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
8. The trainer illustrated the contents by using various methods.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

How did you experience the presentation of the topics/ contents?	Disagree				Agree
	0	1	2	3	4
1. The theoretical input was informative and comprehensible.	☐	☐	☐	☐	☐
2. Theoretical input and practical examples were well balanced.	☐	☐	☐	☐	☐
3. It was aimed at the transfer into practice.	☐	☐	☐	☐	☐
4. It was easy to follow the topics.	☐	☐	☐	☐	☐
5. Exercises helped to approach and to discuss the topics.	☐	☐	☐	☐	☐

We now ask you to give specific feedback.

Positive aspects (I especially liked..., Especially important to me was..., Especially informative was ....)

Negative aspects (In this session I missed ..., I was especially upset about ....)

What did you personally learn – theoretical and/ or practical?

session:.....

Knowledge and skills questionnaire

Dear participants,

As it was already announced the second data collection will be realized after the fifth session.

The following questionnaire consists of three parts which you are already familiar with.

In the first part I want to acquire in how far you enriched your knowledge about certain topics and in how far you gained additional practical experiences at your everyday work.

The second part deals with the ideal innovation promotor. I am interested in your opinion on this topic after half of the training is now realized.

The third part addresses the meta-expectation you already evaluated before the training started.

To ensure anonymity please insert your personal code. Moreover the software *Unipark* guarantees that your IP-address cannot be retraced.

It will take you approximately 20 minutes to fill out the questionnaire.

Please answer spontaneously and rely on your feeling if you are not absolutely sure.

I am honestly interested in your personal opinion.

Your personal code consists of the following information:

1. The first two letters of your mother's prename
2. The day of your date of birth (double digit)
3. The second and third name of your first name

Example: Maria; 25.05.; Anna = MA25NN

Please insert your personal code into the box below:

First Part

In the first part I want to get an impression in how far you are informed about certain topics and in how far you gained practical experiences at your workplace.

You will be presented terms which derive from the contents of the different sessions.

Please evaluate these items on a scale from one to five.

1 = definitely not
2 = probably not
3 = partly
4 = probably
5= definitely

It is furthermore important to evaluate the items concerning two statements.

"*I know*." – This is the first statement you will see. Please give your personal opinion in how far you are familiar with this topic, in how far you have already read or heard something about it. The reference to innovation is especially important. In how far are you aware of the topic's relevance for innovation.

"*I am able to*." – This is the second expression you are asked to judge. It refers to the actual practice at your workplace. This might be the experience with a method, the active implementation of a technique or the transfer of a theoretical approach into practice.

To start the evaluations please click to the next page.

	Definitely not	Probably not	Partly	Probably	Definitely
Learning from mistakes					
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Sustainable conflict management					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Strategic personnel development					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Horizontal & vertical communication					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Active promotion of the innovation process					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Creation of an innovation friendly working environment					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o

	Definitely not	Probably not	Partly	Probably	Definitely
Motivate others					
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Competence development					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Measures to encourage mutual trust					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Sustainability					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Employee orientation					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Project management					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o

	Definitely not	Probably not	Partly	Probably	Definitely
Self-reflection					
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Individual acquisition of knowledge					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Direction of groups					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Systematic monitoring					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Convenient coping with resistance					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Conversation techniques					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o

	Definitely not	Probably not	Partly	Probably	Definitely
Organizational learning					
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Consider the stage of conflict in conflict solving					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Project evaluation					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Visualization					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Moderation					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Interorganizational cooperation					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o

	Definitely not	Probably not	Partly	Probably	Definitely
Entrepreneurial acting					
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Initiate changes					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Participation					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Constructive dealing with setbacks					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Self-management					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Purposeful conflict solving					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o

	Definitely not	Probably not	Partly	Probably	Definitely
Strategic project planning					
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Learing in teams					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Systematic evaluation of innovation					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Analysis of the innovation process					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Exchange of ideas					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o
Active promotion of innovation					
	1	**2**	**3**	**4**	**5**
I know.	o	o	o	o	o
I am able to.	o	o	o	o	o

Second Part

You certainly still remember the ideal innovation promotor you characterized in a group work in the first session.
Please give your personal opinion in how far the characteristics and activities are important to an innovation promotor.

	Not important	Little important	Partly important	Rather important	Very important
Acceptance by the organization	o	o	o	o	o
Teamer	o	o	o	o	o
Combine ideas & knowledge	o	o	o	o	o
Listen carefully	o	o	o	o	o
Empathy	o	o	o	o	o
Persistent	o	o	o	o	o
Communication talent	o	o	o	o	o
Enthusiastic	o	o	o	o	o
Comprehension of employees	o	o	o	o	o
Analytical & structural abilities	o	o	o	o	o
Openness	o	o	o	o	o
Trust	o	o	o	o	o
Networker intern & extern	o	o	o	o	o
Competent appearance	o	o	o	o	o
Ability to motivate others	o	o	o	o	o
Self-confident	o	o	o	o	o
Curious	o	o	o	o	o
Guidance	o	o	o	o	o
Systemic thinking	o	o	o	o	o
Courage	o	o	o	o	o
Assertiveness	o	o	o	o	o
Moderator	o	o	o	o	o
Feeling for timing	o	o	o	o	o
Dynamic	o	o	o	o	o
Marketing consciousness	o	o	o	o	o
Coach	o	o	o	o	o
Creativity	o	o	o	o	o
Informed about internal & external belongings	o	o	o	o	o
Contact to and acceptance by decision makers	o	o	o	o	o
Accepted contact person for colleagues and the management	o	o	o	o	o

Third Part

This is the last part. You will soon have finished.
Please judge which aspects you personally regard as important for a successful ending of the training as innovation promotor.

	Not important	Little important	Partly important	Rather important	Very important
Networking with other innovation promotors	o	o	o	o	o
Feeling of self-efficacy	o	o	o	o	o
Feedback from other participants & trainers	o	o	o	o	o
Methodological manual	o	o	o	o	o
Exchange of experiences with other participants	o	o	o	o	o
Comparison of self image and how the others perceive us	o	o	o	o	o
Practice-relevant exercises	o	o	o	o	o
Clarification about the role of an innovation promotor	o	o	o	o	o
Transfer of expertise	o	o	o	o	o
Theoretical input	o	o	o	o	o
Self-reflection	o	o	o	o	o
Input by experts	o	o	o	o	o

Do you consider yourself on a promising way towards a successful ending of the training?

Yes o No o

This is the end of the questionnaire. You did it!

Thank you very much for your participation and your support!

Interview questions

1. What has been the crucial impulse to participate in the training?

2. What has been the most important insight so far? Did you experience a light bulb moment?

3. Which contents/ impulses/ ideas did you already realize? Please give an example. How was this reflected in your behavior?

4. Did other colleagues/ project members recognize a change in your behavior? Do you remember any comment?

5. Which training element supported you the most to shape your role as innovation promotor?

6. How much time did you spend on training contents besides the actual sessions? What did you do to integrate the contents to your everyday work?

7. Do you regularly discuss the training content and reflect your role with a manager or confidential person?

8. When a close friend of yours asks you what he should expect during the training which aspect would you emphasize?

9. Have you recognized personal development besides your professional qualification as innovation promotor?

D Assumption tests and calculation of local tests of the one-way repeated-measures ANOVA

D.1 Kolmogorov-Smirnov-test

	Asymptotic significance (2-tailed)		
	Global satisfaction	**Content**	**Didactic**
t1	p = .581	p = .513	p = .582
t2	p = .865	p = .603	p = .073
t3	p = .642	p = .873	p = .887
t4	p = .992	p = .566	p = .390
t5	p = .885	p = .567	p = .922

D.2 Mauchly's test

		Asymptotic significance (two-tailed)
Global satisfaction	χ^2 (9) = 16.25	p = .064
Satisfaction with content	χ^2 (9) = 14.81	p = .099
Satisfaction with didactic	χ^2 (9) = 12.86	p = .172

D.3 Local tests

Global satisfaction

	Asymptotic significance (two-tailed)
t1 – t3	p = .017
t3 – t4	p = .003
t1 – t5	p = .003
t2 – t5	p = .002
t4 – t5	p = .002

Satisfaction with content

	Asymptotic significance (two-tailed)
t1 – t3	p = .028
t3 – t4	p = .000

Satisfaction with didactic

	Asymptotic significance (two-tailed)
t1 – t3	p = .034
t1 – t4	p = .044
t1 – t5	p = .002
t2 – t5	p = .004
t3 – t4	p = .003
t4 – t5	p = .000

E Assumption test for the dependent-means t-test

Kolmogorov-Smirnov-Test

	Asymptotic significance (2-tailed)					
	Theoretical knowledge	**Practical knowledge**	**Cluster 1_theoretical**	**Cluster 1_practical**	**Cluster 2_theoretical**	**Cluster 2_ practical**
t1	p = .087	p = .914	p = .091	p = .683	p = .276	p = .990
t2	p = .457	p = .749	p = .317	p = .795	p = .327	p = .422

F Descriptive statistics for role-expectations

F.1 First point of measurement (T1)

	mean_t1	SD	Cluster
Contact to and acceptance by decision makers	4.86	.36	Basis
Acceptance by the organization	4.79	.43	Basis
Accepted contact person for colleagues and the management	4.79	.43	Basis
Teamer	4.64	.50	Basis
Combine ideas & knowledge	4.64	.50	Thinking
Listen carefully	4.64	.63	Tools
Empathy	4.57	.51	Gut feeling & heart
Persistent	4.57	.51	Thinking
Communication talent	4.57	.65	Gut feeling & heart
Enthusiastic	4.57	.51	Gut feeling & heart
Comprehension of employees	4.57	.51	Gut feeling & heart
Analytical & structural abilities	4.50	.65	Thinking
Openness	4.50	.65	Thinking
Trust	4.50	.65	Basis
Networker intern & extern	4.50	.76	Basis
Informed about internal & external belongings	4.43	.65	Thinking
Competent appearance	4.36	.75	Basis
Ability to motivate others	4.36	1.08	Tools
Self-confident	4.21	.58	Basis
Curious	4.14	.77	Thinking
Guidance	4.14	.86	Thinking
Systemic thinking	4.14	.95	thinking
Courage	4.07	.62	Thinking
Assertiveness	4.00	.78	Basis
Moderator	3.86	.95	Tools
Feeling for timing	3.86	.95	Gut feeling & heart
Dynamic	3.86	.54	Basis
Marketing consciousness	3.57	.85	Tools
Coach	3.36	1.16	tools
Creativity	3.21	.70	Thinking

F.2 Second point of measurement (T2)

	mean_t2	SD	Cluster
Accepted contact person for colleagues and the management	4.93	.26	Basis
Listen carefully	4.80	.41	Tools
Openness	4.80	.56	Thinking
Communication talent	4.67	.62	Gut feeling & heart
Persistent	4.67	.72	Thinking
Trust	4.67	.49	Basis
Empathy	4.67	.49	Gut feeling & heart
Acceptance by the organization	4.67	.49	Basis
Networker intern & extern	4.60	.51	Basis
Combine ideas & knowledge	4.53	.64	Thinking
Comprehension of employees	4.53	.64	Gut feeling & heart
Contact to and acceptance by decision makers	4.47	.52	Basis
Informed about internal & external belongings	4.47	.64	Thinking
Competent appearance	4.40	.63	Basis
Systemic thinking	4.40	.63	Thinking
Self-confident	4.33	.62	Basis
Teamer	4.33	.62	Basis
Courage	4.27	.70	Thinking
Guidance	4.27	.96	Thinking
Ability to motivate others	4.27	.70	Tools
Enthusiastic	4.27	.70	Gut feeling & heart
Feeling for timing	4.20	.68	Gut feeling & heart
Analytical & structural abilities	4.20	.68	Thinking
Moderator	4.20	.68	Tools
Assertiveness	4.13	.74	Basis
Curious	4.07	.80	Thinking
Coach	3.80	.82	Tools
Dynamic	3.60	.63	Basis
Marketing consciousness	3.40	1.12	Tools
Creativity	3.40	.83	Thinking

F.3 Cluster

	mean (SD)			
	Cluster: thinking	**Cluster: tools**	**Cluster: gut feeling & heart**	**Cluster: basis**
T1	4.23 (SD .44)	3.96 (SD .57)	4.43 (SD .35)	4.45 (SD .26)
T2	4.31 (SD .43)	4.10 (SD .48)	4.47 (SD .40)	4.41 (SD .24)